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HYDROPTILIDAE (TRICHOPTERA) OF COSTA RICA: THE GENUS *OXYETHIRA* EATON

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Abstract.—Nine new species of *Oxyethira* (Trichoptera: Hydroptilidae) are described from Costa Rica: *O. apinolada, O. cuernuda, O. culebra, O. espinada, O. hilosa, O. rareza, O. sencilla, O. sierruca,* and *O. tica.* Males of each new species are described and figured. In addition, distribution records are presented for eight previously described species occurring in Costa Rica: *O. arizona* Ross, *O. azteca* (Mosely), *O. costaricensis* Kelley, *O. glasa* (Ross), *O. janella* Denning, *O. parazteca* Kelley, *O. parce* (Edwards and Arnold), and *O. simulatrix* Flint. A key is provided to males of the Costa Rican species.

This paper on the genus *Oxyethira* Eaton is the latest addition to our series dealing with the taxonomy and systematics of the microcaddisflies of Costa Rica (Trichoptera: Hydroptilidae). In this paper, we describe nine new species of *Oxyethira* from Costa Rica (one is also known from Panama) and provide distribution records for an additional eight Costa Rican species. These new species and new records are the result of an ongoing field inventory of Costa Rican microcaddisfly biodiversity (Harris and Holzenthal, 1990).

Kelley (1984) provided the most recent review of the genus, its subgenera and species groups, and he included a detailed discussion of male and female morphology. His checklist of the world species included 43 from the Neotropics. The occurrence of 17 species, including nine new species, in Costa Rica alone, suggests that many more Neotropical *Oxyethira* await discovery. Important papers describing portions of the Neotropical *Oxyethira* fauna include those of Botosaneanu (1979) and Flint 1964, 1968a, b) for the Antilles, Mosely (1937) for Mexico, Mosely (1939) for Brazil, Flint (1974) for Surinam, Flint (1980) for Argentina, and Kelley (1983) for the Neotropics in general. Previously described Neotropical *Oxyethira* and their general distribution include *aculea* Ross 1941 (Mexico), *alaluz* Botosaneanu 1979 (Cuba), *andina* Kelley 1983 (S Andes), *arctodactyla* Kelley 1983 (Venezuela), *argentinensis* Flint 1982 (Argentina), *arizona* Ross 1948 (SW USA; Central America; Greater Antilles) (*cirrifera* Flint 1964 is a synonym), *azteca* (Mosely) 1937 (SW USA to Argentina[1]), *bicornuta* Kelley 1983 (N Brazil), *bidentata* (Mosely) 1934 (S Andes), *brasiliensis* Kelley 1983 (Brazil), *campesina* Botosaneanu 1977 (Cuba), *circaverna* Kelley 1983 (Ecuador; Panama), *colombiensis* Kelley 1983 (Colombia), *costaricensis* Kelley 1983 (Costa Rica), *dactylonedys* Kelley 1983 (Paraguay), *dalmeria* (Mosely) 1937 (Mexico), *discaelata* Kelley 1983 (N Brazil), *glasa* (Ross) 1941 (Cuba; SE USA), *hyalina* Müller 1879 (Brazil), *jamaicensis* Flint 1968 (Jamaica), *janella* Denning 1948 (SE USA to Amazon[1]), (*neglecta* Flint 1964 is a synonyn), *lagunita* Flint 1981 (N Argentina to S Brazil), *longissima* Flint 1974 (Surinam), *macrosterna* Flint 1974

(Surinam; N Brazil), *maryae* Kelley 1983 (Colombia), *maya* Denning 1947 (SE USA; Mexico), *merga* Kelley 1983 (Venezuela), *obscura* Flint 1974 (Surinam), *parazteca* Kelley 1983 (Costa Rica; Ecuador), *parce* (Edwards and Arnold) 1961 (SW USA to Peru[1]), *paritentacula* Kelley 1983 (Belize), *puertoricensis* Flint 1968 (Puerto Rico), *quelinda* (Botosaneanu) 1979 (Cuba), *quinquaginta* Kelley 1983 (Ecuador), *santiagensis* Flint 1982 (N Argentina to S Brazil), *scaeodactyla* Kelley 1983 (Ecuador), *simulatrix* Flint 1968 (Jamaica; Central America), *spirogyrae* Müller 1879 (Brazil), *spissa* Kelley 1983 (Brazil), *tega* Flint 1968 (Cuba; Jamaica), *ulmeri* Mosely 1937 (SW USA; N Mexico), *unispina* Flint 1974 (Surinam), *vipera* Kelley 1983 (S Andes), *zilaba* (Mosely) 1939 (Brazil; Paraguay; Argentina). Complete citations of papers containing original descriptions of these species can be found in Kelley's (1984) paper.

Terminology for this paper follows that of Marshall (1979). In Figures 1–9, letters A, B, and C refer to lateral, dorsal, and ventral views, respectively, of the genitalia; E and F are lateral and dorsal (or ventral where indicated) views of the phallus or internal sclerites of the female genitalia. Type material will be deposited in the National Museum of Natural History, Smithsonian Institution, Washington, D.C. (NMNH), the Instituto Nacional de Biodiversidad, Costa Rica (INBIO), the University of Minnesota Insect Collection, St. Paul (UMSP), and the University of Alabama, Tuscaloosa (UAL), as indicated below. All specimens of previously described species upon which new records are based are from UMSP, except where indicated.

Oxyethira Eaton

Oxyethira Eaton, 1873:143. Type species by original designation, *Hydroptila costalis* Curtis, is a species of *Orthotrichia* and should be replaced by *Hydroptila flavicornis* Pictet, accroding to Neboiss 1963.

Adult *Oxyethira* can be recognized by the presence of three ocelli, a 0-3-4 tibial spur formula, and a mesoscutellum with its anterior margin convex and its posterior margins slightly concave. General characteristics of the male genitalia include sternum VII with a short, apicomesal process; tergum and sternum VIII excised apically; segment IX withdrawn into segment VIII, with upper half often reduced to a transverse band and venter pointed or broadly rounded anteriorly; segment X membranous and indistinct; the presence of a subgenital plate with a bilobed process originating at its basoventral margin; and a pair of short, fused inferior appendages. The phallus is typically long and slender with a variety of modifications including sclerotized processes, spines, and membranous lobes.

Characteristics of the female genitalia include sternum VII with a short process; reduction of segments VIII, IX, and X; segment VIII narrowed laterally into anteriorly directed apodemes, and X terminating in a pair of cerci. Several internal processes and sclerites associated with the reproductive structures are diagnostic in the females. These include the spermathecal process, which orginates anteroventrally, and the associated spermathecal sclerite; the sclerotized dorsum of the oviduct; the posterior

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[1] The discovery of *O. tica* and the resurrection of *O. parce* from synonymy with *O. azteca* requires a reassessment of the distributions of these species.

ring sclerite which encircles the oviduct in some species; and in species of the Azteca Group a pair of ventral processes which support the oviduct.

Wiggins (1977) provided a detailed description of the fifth instar larva of the genus. Larvae typically live in standing water or the slower areas of rivers. Fifth instar larvae build transparent, flattened, bottle-shaped cases entirely of silk. Larvae generally feed by puncturing filamentous algal cells and sucking out the cytoplasm.

Oxyethira apinolada, new species
Fig. 1

This species appears to be a member of Kelley's (1984) Aeola Group of the subgenus *Oxytrichia*. It is somewhat similar to *O. vipera* Kelley in the dorsolateral projections of segment IX and the dorsolateral incision of segment VIII, although this incision is much shorter in the new species. It differs from *O. vipera* in the longer inferior appendages, trilobed subgenital plate, and absence of bilobed processes.

Male. Length 2.4–2.6 mm. Brown in alcohol. Antennae with 27 segments. Genitalia as in Figure 1. Abdominal sternum VII with short, apicomesal process. Segment VIII with lightly sclerotized, setose, dorsolateral lobes; tergum VIII with broad, shallow, mesal excavation; sternum VIII with deep, V-shaped, mesal excavation. Segment IX extending anteriorly to middle of segment VII; in dorsal view, posterior portion wide and rounded; in lateral view, posterior portion narrow, tapered; segment IX bearing elongate, narrow, apically acute, sclerotized, dorsolateral processes. Segment X membranous, indistinct. Inferior appendages sclerotized, elongate, slightly convex in lateral view; tapering to acute apex; in ventral view, rectangular. Subgenital plate tapering posteriorly; in ventral view, wide, trilobed, the lateral lobes bearing numerous stout setae. Bilobed processes absent. Phallus somewhat rectangular; bearing sclerotized subapical process nearly encircling distal membranous lobe and second, short, acute, subapical, sclerotized process.

Holotype. Male, COSTA RICA: GUANACASTE: Parque Nacional Rincón de la Vieja, Quebrada Agua Apinolada, 10.759°N, 85.292°W, el. 795 m, 25.vi.1986, Holzenthal, Heyn, Armitage (NMNH).

Paratype. COSTA RICA: ALAJUELA: Río Pizote, 5 km (air) S Brasilia, 10.972°N, 85.345°W, el. 390 m, 12.iii.1986, Holzenthal and Fasth, 1 male (UMSP).

Etymology. Named for the type locality, Quebrada Agua Apinolada.

Oxyethira cuernuda, new species
Fig. 2

This species appears to be a member of subgenus *Tanytrichia* Kelley based on the elongate nature of segment IX and general structure of the phallus. The elongate dorsal processes of segment VIII and the bifid lateral processes of the phallus separate the new species from others in the subgenus.

Male. Length 2.0–2.4 mm. Brown in alcohol. Antennae with 26 segments. Genitalia as in Figure 2. Abdominal sternum VII with short, apicomesal process. Segment VIII with dorsolateral margin produced into a long, thin process; tergum and sternum VIII deeply excised. Segment IX elongate, narrow; extending anteriorly beyond middle of segment VI. Segment X membranous, indistinct. Inferior appendages in lateral view short, sclerotized, acute posteriorly; in ventral view widely separated, apices

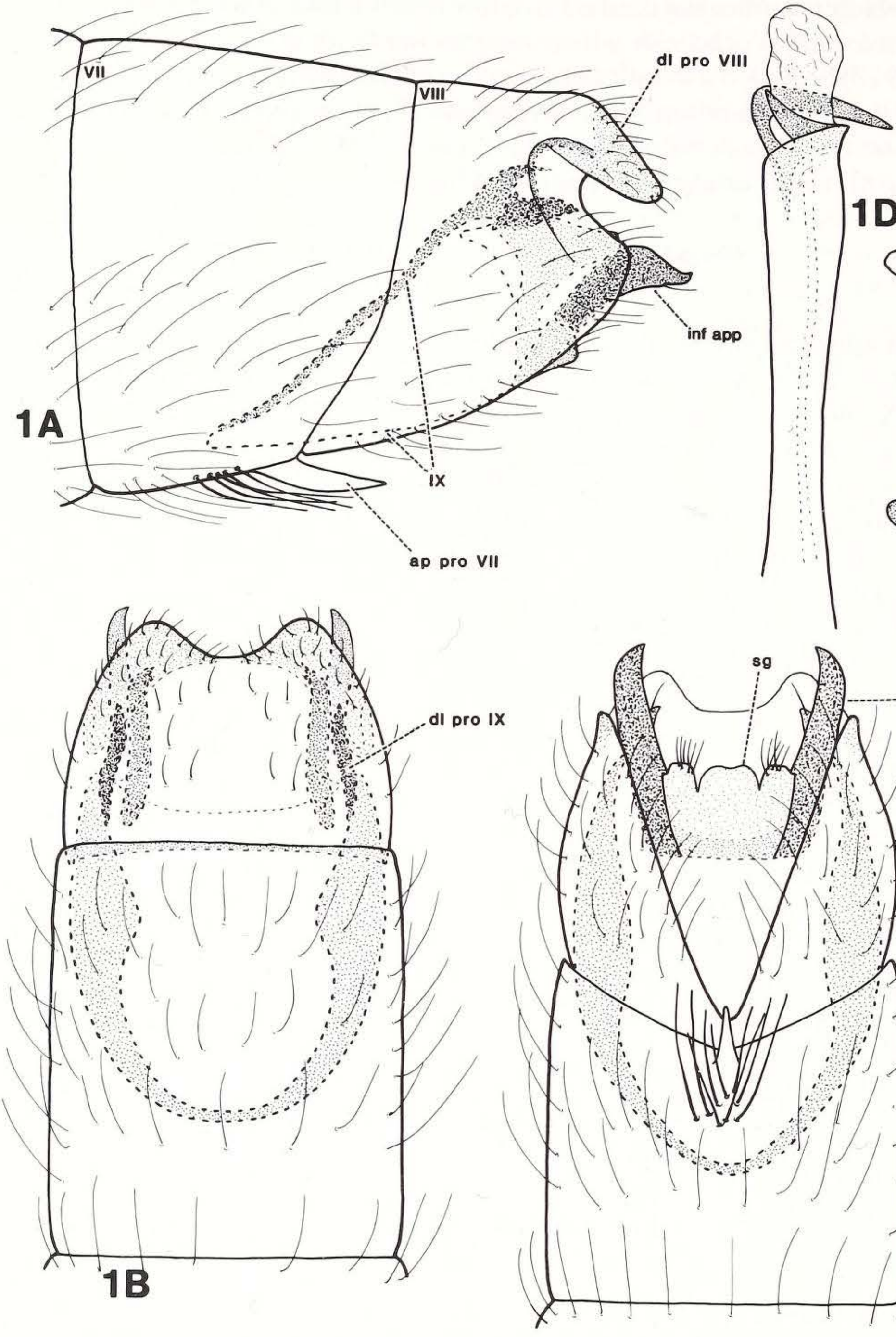
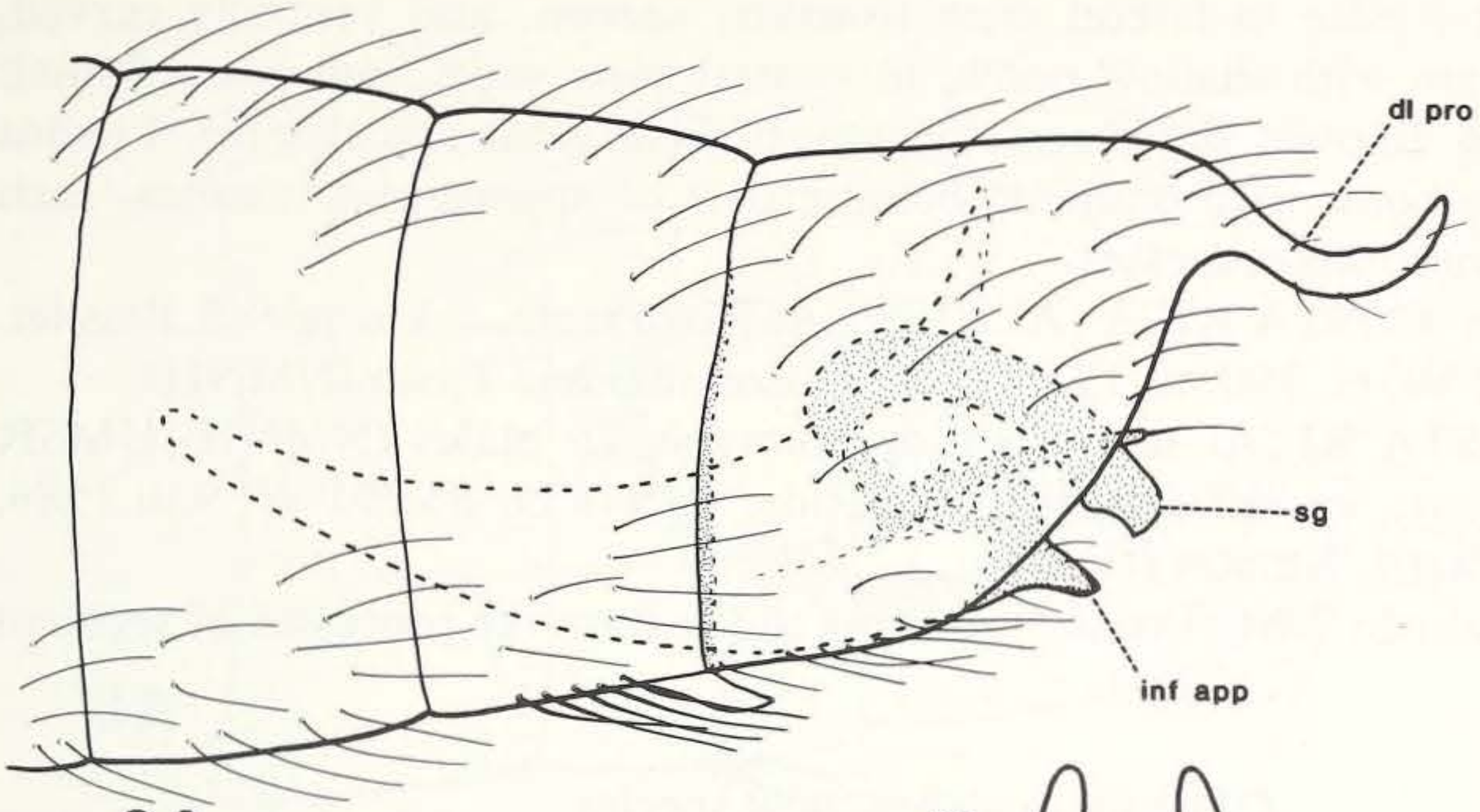
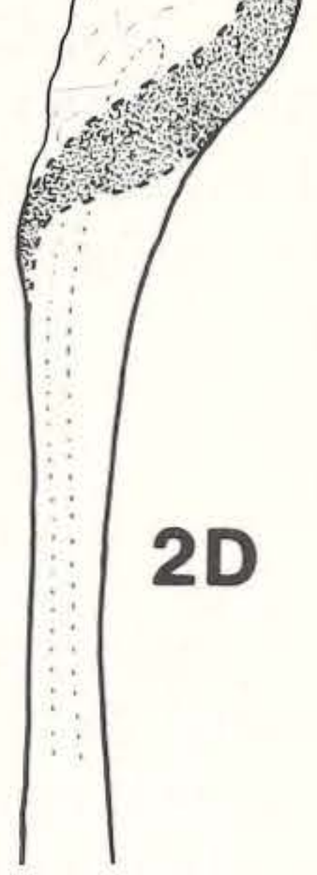


Fig. 1. *Oxyethira apinolada,* new species, male genitalia. A. Lateral. B. Dorsal. C. Ventral. D. Phallus, lateral; inset, details of apical sclerites. Abbreviations: VII, VIII, IX = abdominal segments VII, VIII, IX, respectively; ap pro VII = apicomesal process of segment VII; dl pro IX = dorsolateral process of segment IX; dl pro VIII = dorsolateral process of segment VIII; inf app = inferior appendage; sg = subgenital plate.



2A



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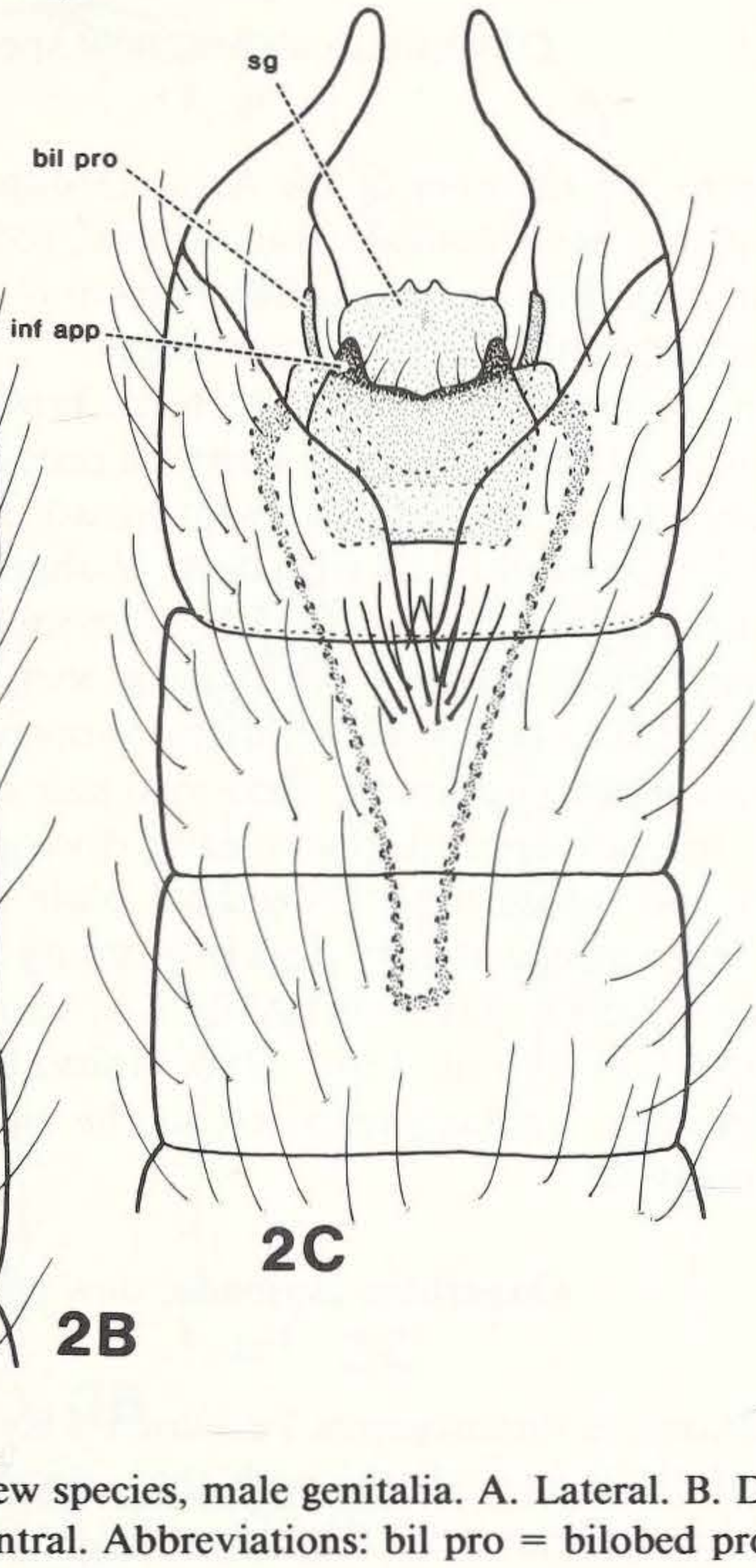

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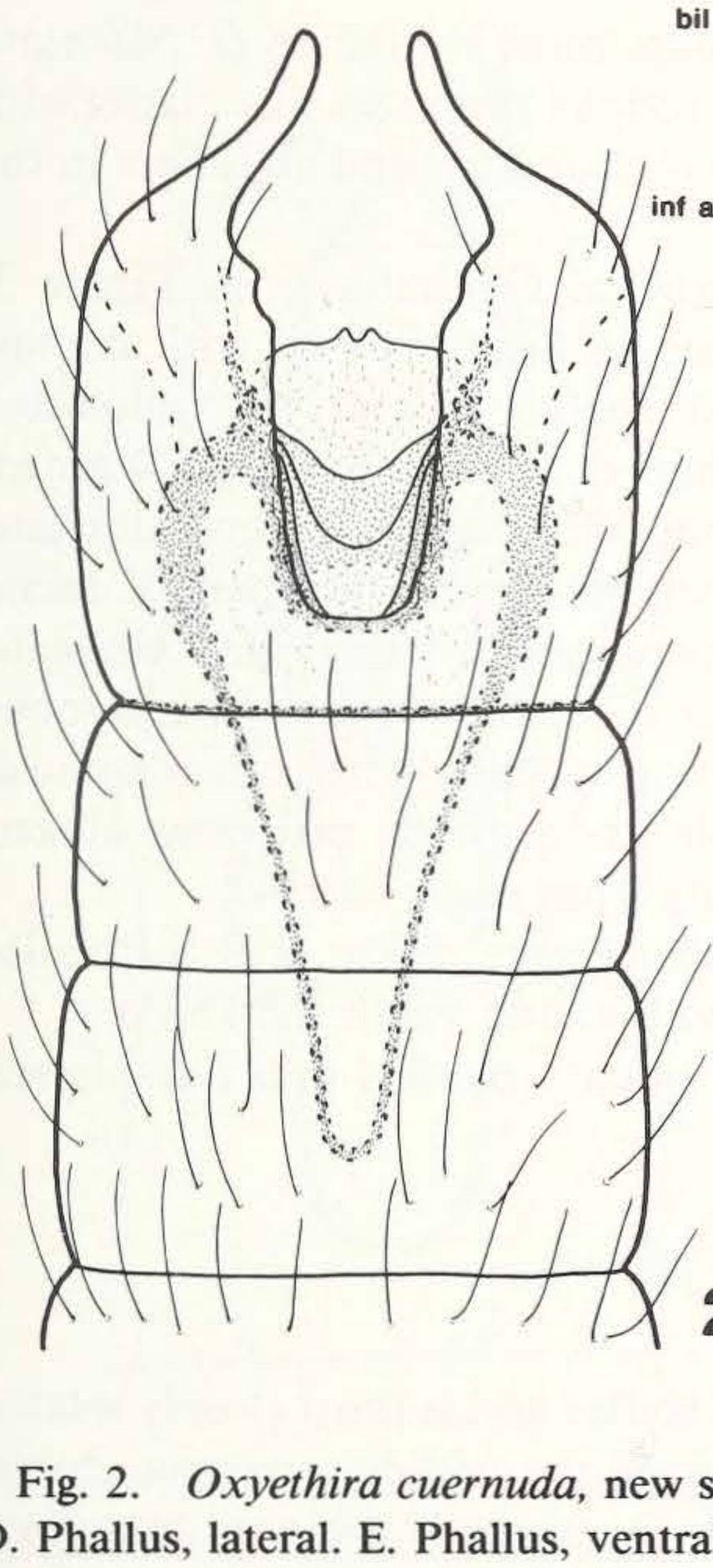
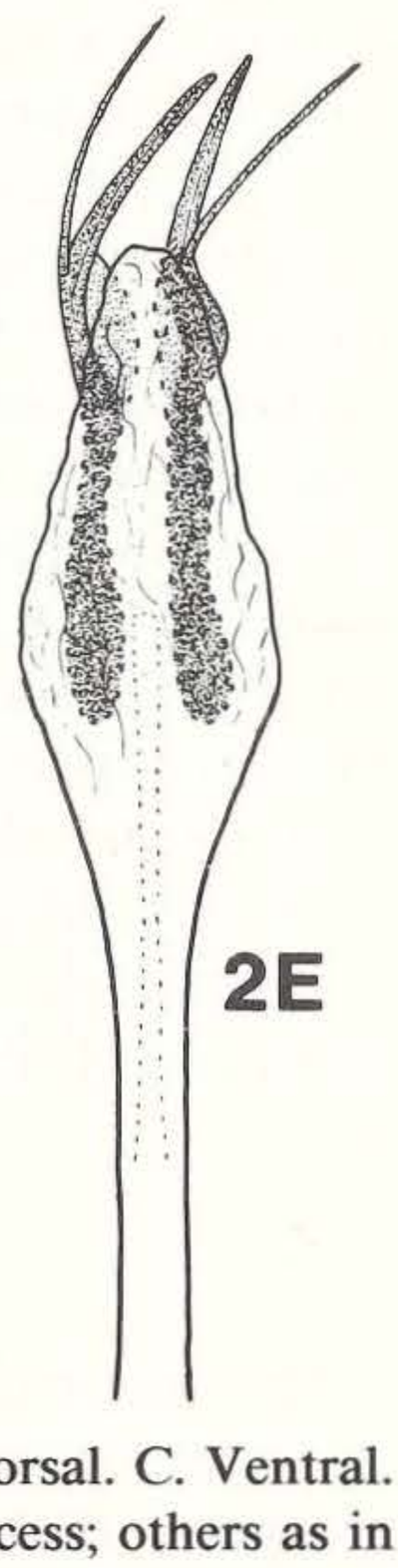


2B



2E

Fig. 2. *Oxyethira cuernuda,* new species, male genitalia. A. Lateral. B. Dorsal. C. Ventral. D. Phallus, lateral. E. Phallus, ventral. Abbreviations: bil pro = bilobed process; others as in Figure 1.

narrow. Subgenital plate in lateral view elongate, narrow, and ventrally curved, apicoventral margin with shallow notch; in ventral view wide, with pair of small mesal projections. Bilobed processes elongate, bearing stout apical setae. Phallus elongate, apex bulbous, membranous, bearing pair of apicolateral sclerites, each divided distally into thin processes.

Holotype. Male, COSTA RICA: ALAJUELA: Río Pizote, 5 km (air) S Brasilia, 10.972°N, 85.345°W, el. 390 m, 12.iii.1986, Holzenthal and Fasth (NMNH).

Paratypes. COSTA RICA: same data as holotype, 26 males (NMNH, UMSP, INBIO, UAL); same, except 5 km N Dos Ríos, 10.948°N, 85.291°W, 9.iii.1986, Holzenthal and Fasth, 9 males (UMSP).

Etymology. Spanish: "with horns," referring to the hornlike processes of segment VIII.

Oxyethira culebra, new species

Fig. 3

Oxyethira culebra is a member of the Aeola Group, most similar to *O. bidentata* (Mosely). Both species have elongate, dorsolateral, rodlike processes associated with abdominal segment IX, but *O. culebra* differs from *O. bidentata* and all others in the group in the structure of the inferior appendages.

Male. 2.8 mm. Brown in alcohol. Antennae broken. Genitalia as in Figure 3. Abdominal sternum VII with short, apicomesal process. Segment VIII with shallow dorsolateral emargination; tergum VIII with broad, shallow, mesal excavation and rounded lateral lobes; sternum VIII with deep, V-shaped, mesal excavation. Segment IX narrow, extending anteriorly to middle segment VI; bearing narrow, elongate, sinuate dorsolateral processes, each with single, long apical seta. Segment X membranous, apex rounded in dorsal view. Inferior appendages in lateral view elongate, narrow, their apices acute, upturned; each with pair of small subapicoventral lobes; in ventral view, inferior appendages apically divergent, each with subapicomesal sclerotized point and setose lobe. Subgenital plate and bilobed processes absent. Phallus narrow, sinuate; ejaculatory duct protruding from apex, hairlike.

Holotype. Male, COSTA RICA: ALAJUELA: Río Pizote, 5 km (air) S Brasilia, 10.972°N, 85.345°W, el. 390 m, 12.iii.1986, Holzenthal and Fasth (NMNH).

Etymology. Spanish: "snake," referring to the sinuate phallus and dorsolateral processes of segment IX.

Oxyethira espinada, new species

Fig. 4

This species belongs to the subgenus *Tanytrichia* Kelley and is most closely related to *O. paritentacula* Kelley. It shares with that species the widely separated dorsal processes of abdominal segment VIII. However, in *O. espinada* these processes are short, do not converge apically, and have a series of large, dorsal, apical and subapical spinelike setae.

Male. Length 2.5–2.7 mm. Brown in alcohol. Antennae with 34 segments. Genitalia as in Figure 4. Abdominal sternum VII with short, apicomesal process. Segment VIII in lateral view very acute posteriorly, apex upturned; sternum VIII with deep, narrow, U-shaped, mesal excavation; tergum VIII with paired, narrow, sclerotized, dorsobasal

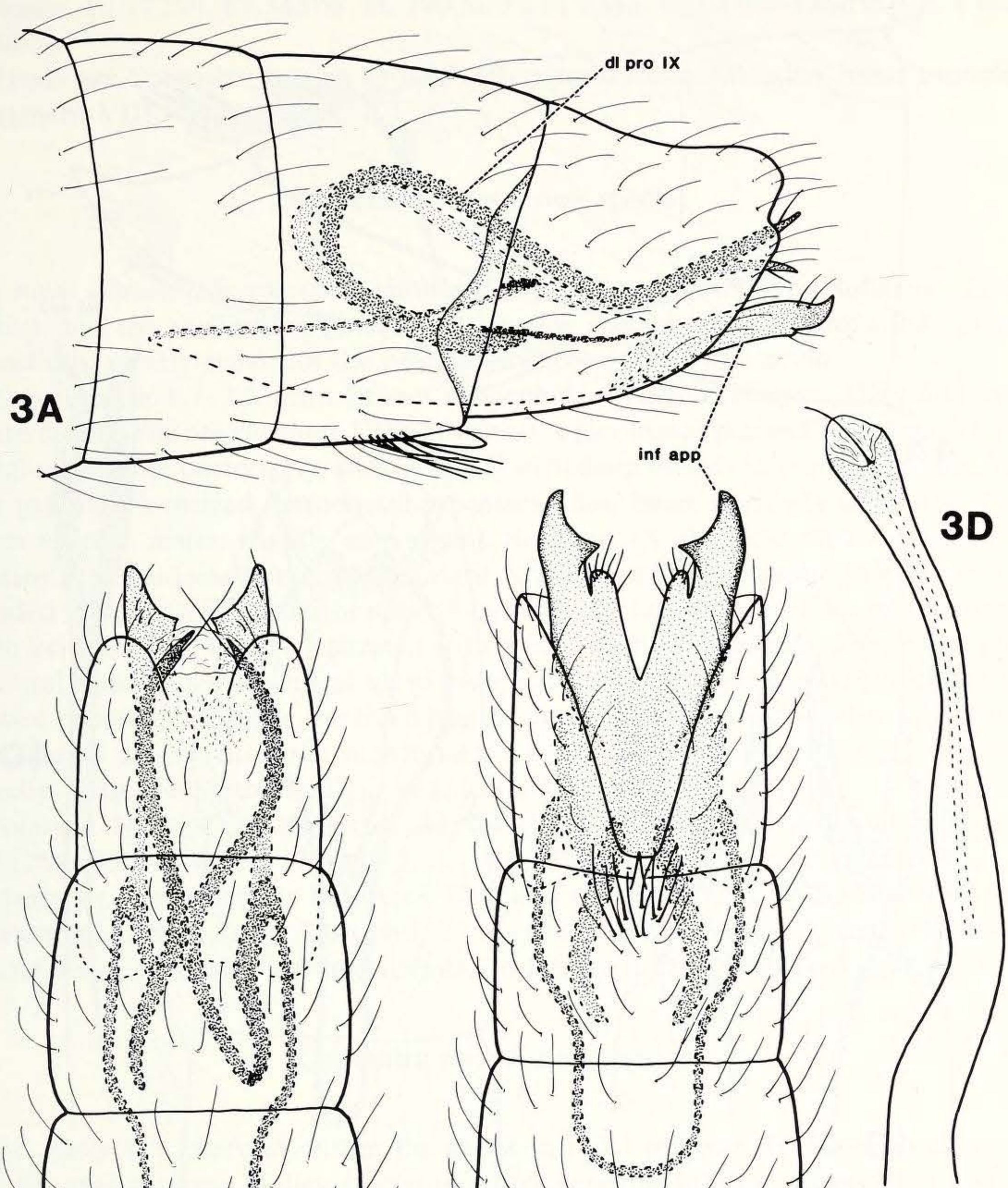
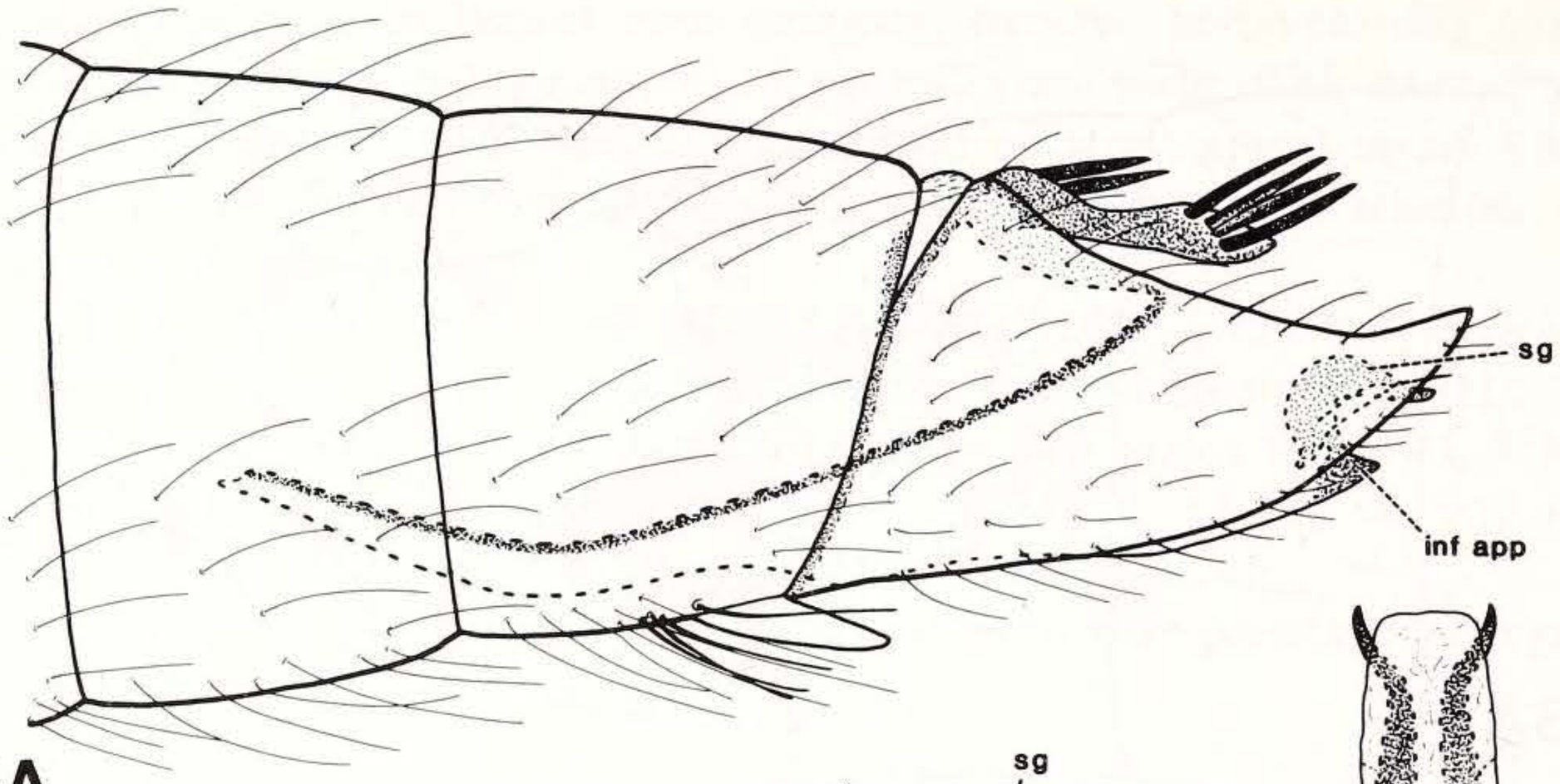
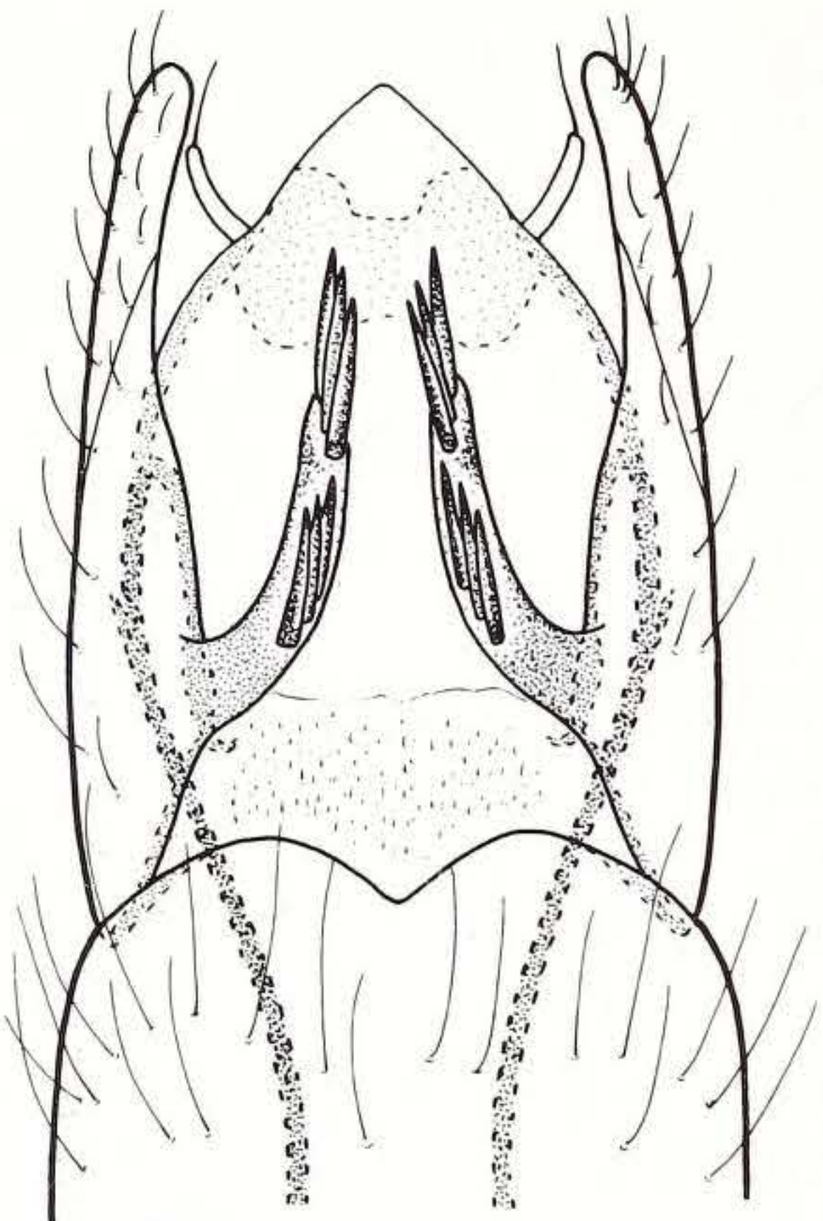


Fig. 3. *Oxyethira culebra,* new species, male genitalia. A. Lateral. B. Dorsal. C. Ventral. D. Phallus, lateral. Abbreviations as in Figures 1 and 2.

processes; each process bearing several stout, apicodorsal and subapicodorsal, spine-like setae. Segment IX elongate, narrow, extending anteriorly to middle of segment VI. Segment X membranous, indistinct. Inferior appendages in lateral view short, apically acute; in ventral view, widely separated, apically truncate. Subgenital plate



4A



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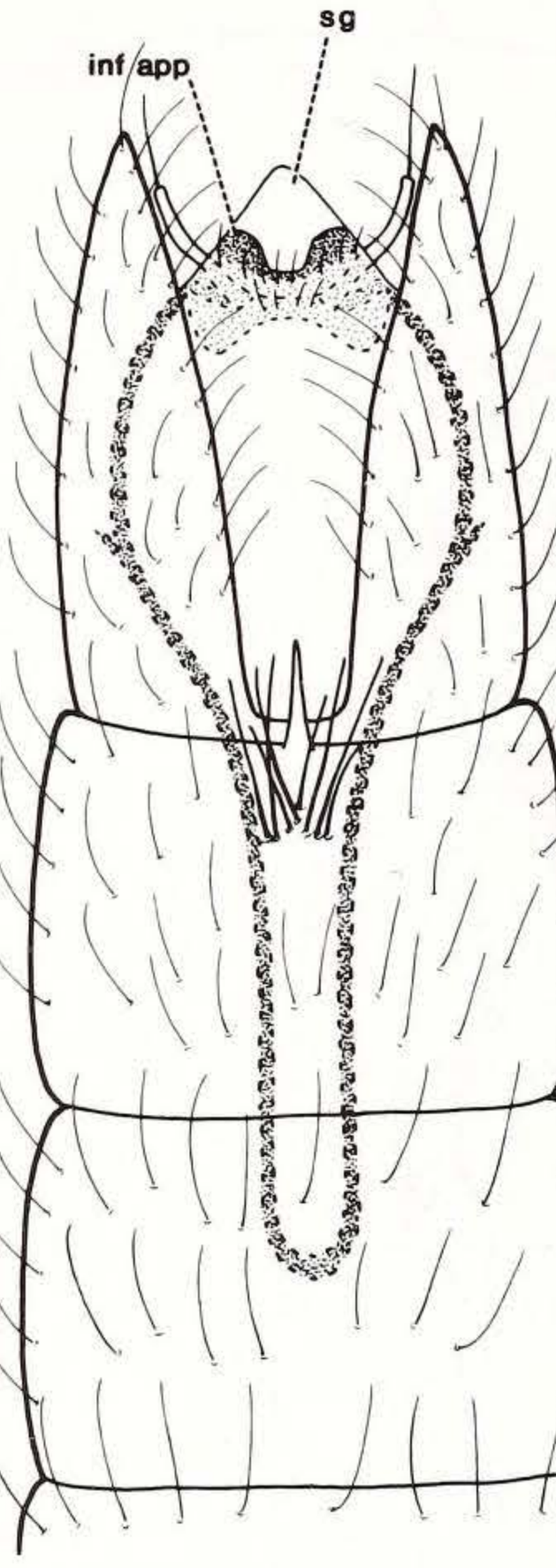

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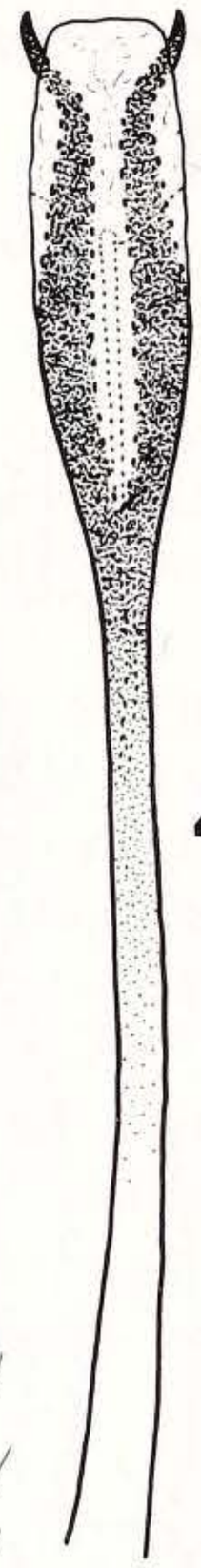


4D

Fig. 4. *Oxyethira espinada,* new species, male genitalia. A. Lateral. B. Dorsal. C. Ventral. D. Phallus, ventral. Abbreviations as in Figures 1 and 2.

in lateral view short, base rounded, apex acute; in ventral view, triangular. Bilobed processes elongate, each bearing stout apical seta. Phallus with basal portion elongate, tubular; distal portion bearing two sclerotized lateral processes, each with acute, outwardly directed apex.

Holotype. Male, COSTA RICA: ALAJUELA: Río Pizote, 5 km N Dos Ríos, 10.948°N, 85.291°W, 9.iii.1986, Holzenthal and Fasth (NMNH).

Paratypes. Same data as holotype, 2 males (UMSP, UAL); same, except 5 km (air)

S Brasilia, 10.972°N, 85.345°W, el. 390 m, 12.iii.1986, Holzenthal and Fasth, 1 male (INBIO).

Etymology. Spanish: "having spines," referring to the spine-laden dorsal processes of segment VIII.

Oxyethira hilosa, new species
Fig. 5

In most aspects this species is similar to *O. paritentacula* Kelley (subgenus *Tanytrichia*), but the distinctive phallus of the new species, with its threadlike lateral projections, clearly separates the new species from *O. paritentacula.*

Male. Length 1.7–2.2 mm. Brown in alcohol. Antennae broken. Genitalia as in Figure 5. Abdominal sternum VII with short, apicomesal process. Segment VIII in lateral view acute posteriorly; sternum VIII with deep mesal excavation; tergum VIII with paired, sclerotized, basodorsal processes, their bases narrowly separated, their apices narrow, acute, slightly convergent. Segment IX elongate, narrow; extending anteriorly well into segment VI. Segment X membranous; truncate in lateral view, rounded in dorsal view. Inferior appendages short in lateral view, their apices rounded; in ventral view, widely separated with apices slightly triangular. Subgenital plate in lateral view wide; in ventral view wide, with rounded apicomesal protuberance. Bilobed processes elongate, each bearing stout, apical seta. Phallus with pair of long lateral arms arising in mesal membranous area; each arm thin, strongly recurved dorsally, with dorsal, threadlike, subapical extension.

Holotype. Male, COSTA RICA: ALAJUELA: Río Pizote, 5 km (air) S Brasilia, 10.972°N, 85.345°W, el. 390 m, 12.iii.1986, Holzenthal and Fasth (NMNH).

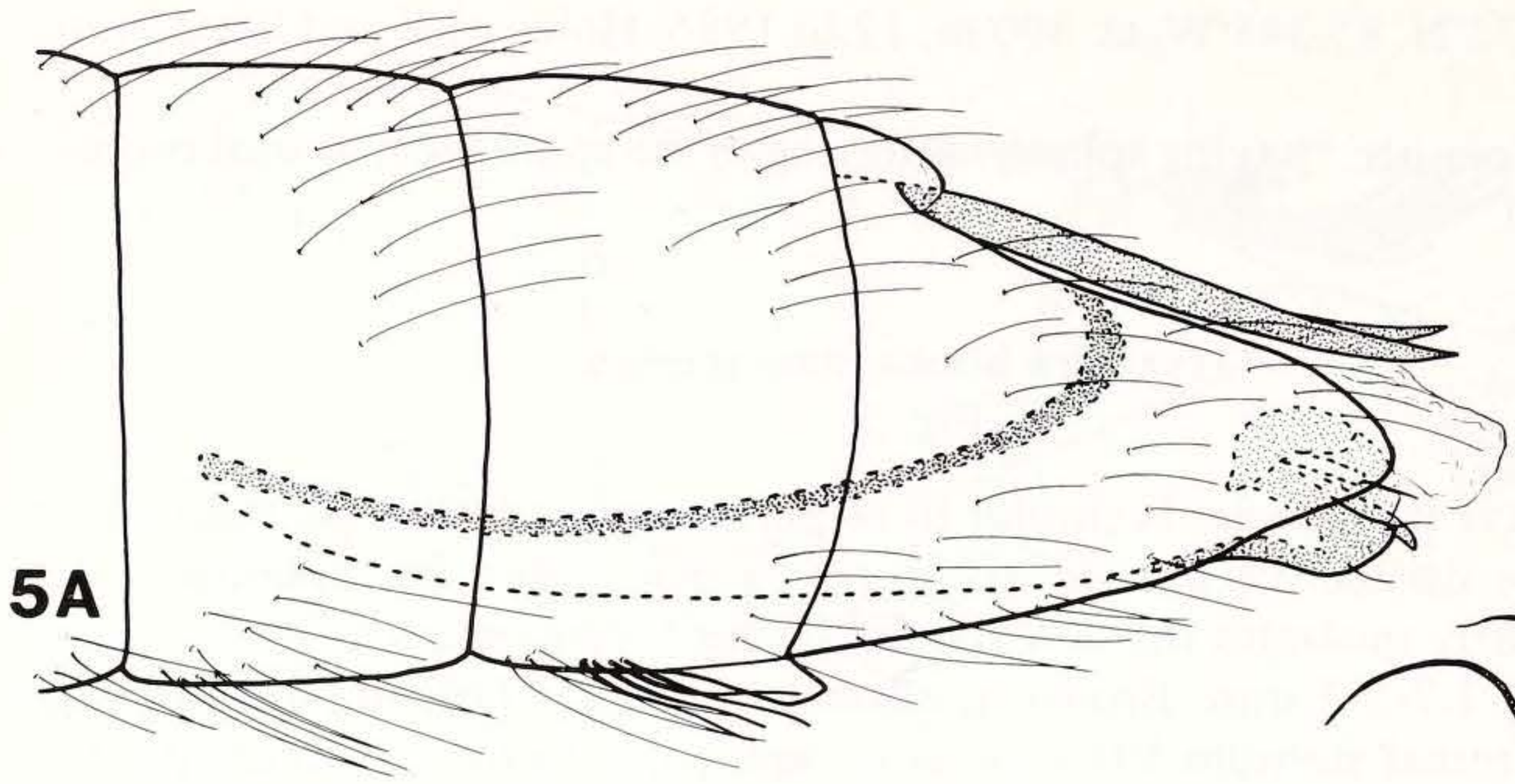
Paratypes. Same data as holotype, 13 males (UMSP, UAL, INBIO); PANAMA: International Canal Zone, Lion Hill, 26.vii.1981, R. B. Kimsey, 3 males (NMNH).

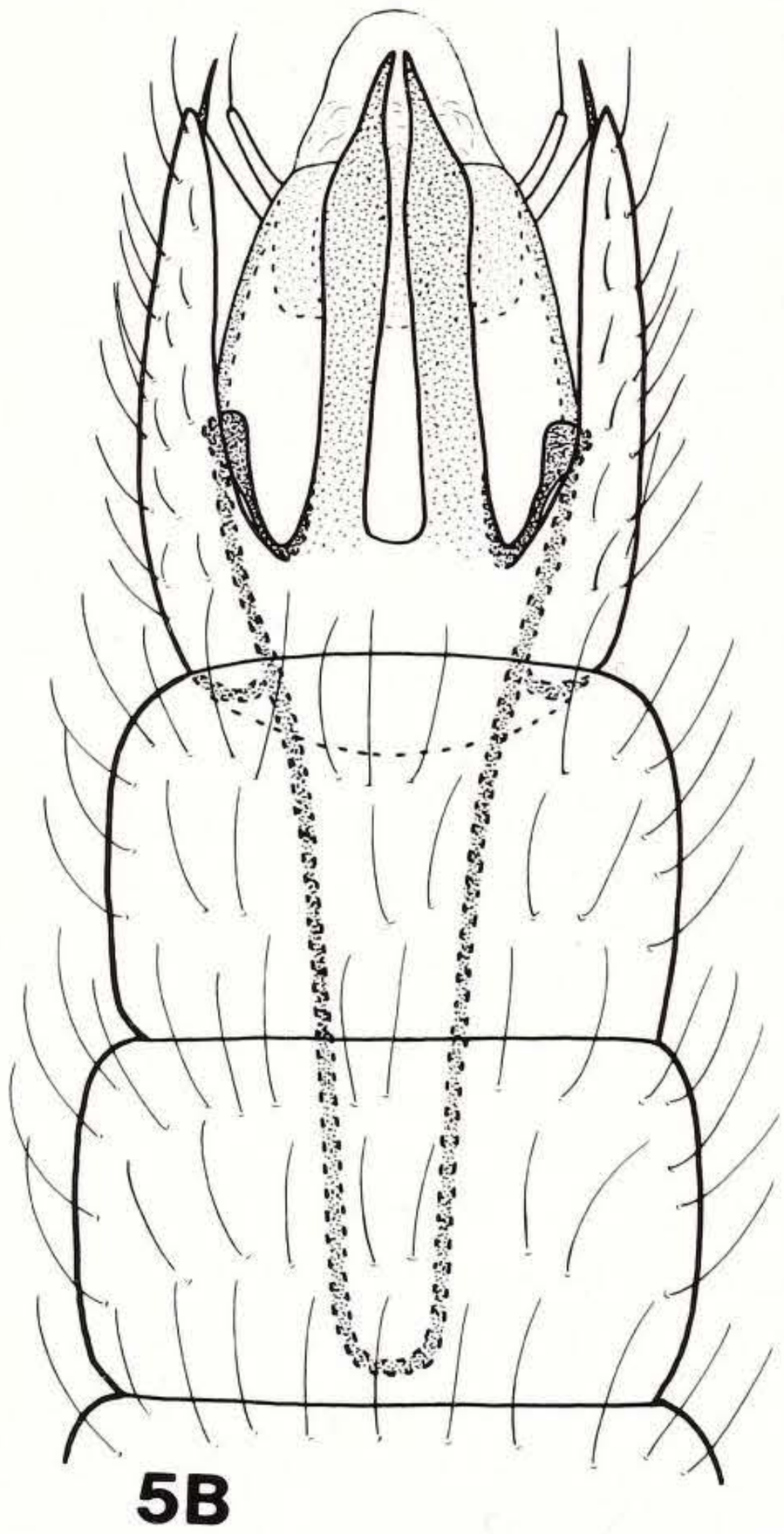
Etymology. Spanish: "having threads," referring to the distinctive phallus.

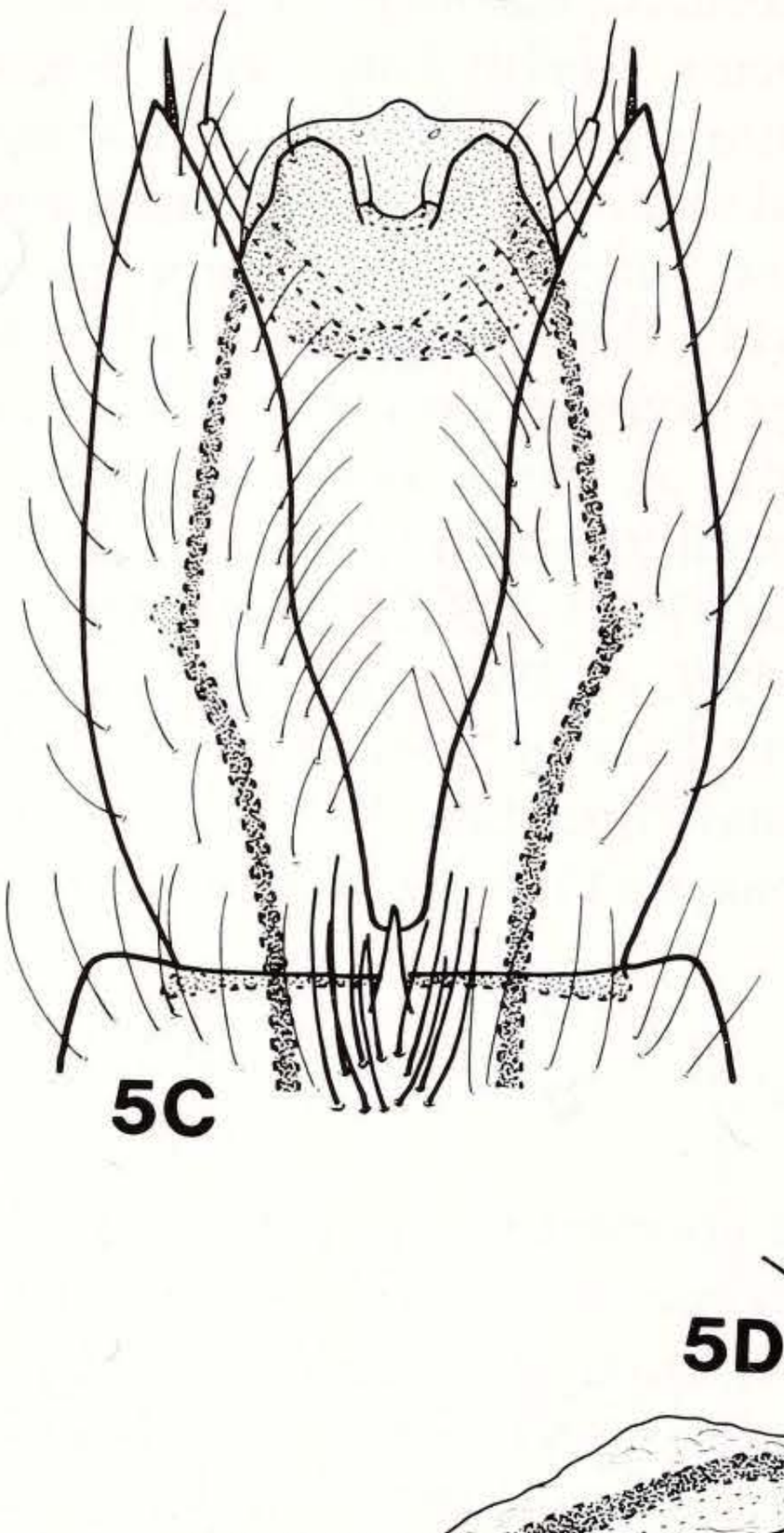
Oxyethira rareza, new species
Fig. 6

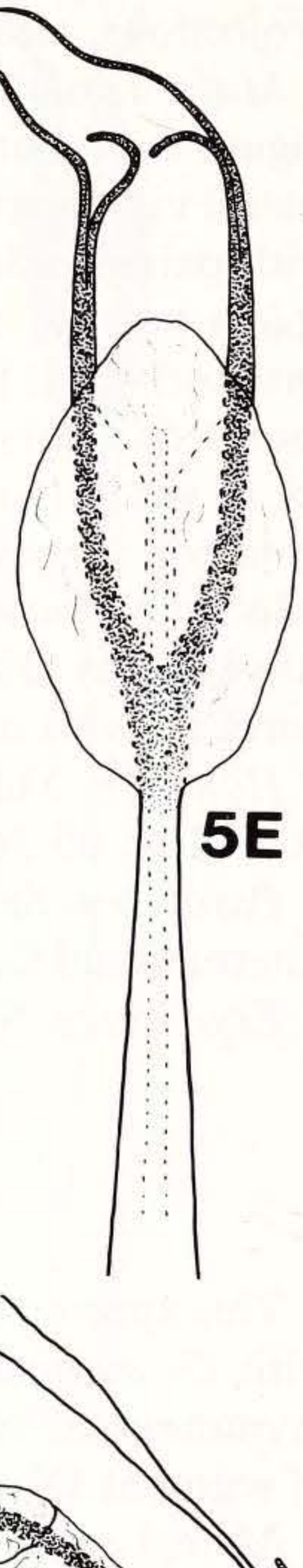
This species is aberrant within the genus in most respects. It shares in common with *O. quinquaginta* Kelley (*incertae sedis*) vestigial inferior appendages and an asymmetrical subgenital plate, but it also shares similar elongate, dorsal processes of segment IX with *O. andina* Kelley (Aeola Group of subgenus *Oxytrichia*).

Male. Length 1.8–2.1 mm. Brown in alcohol. Antennae with 34 segments. Genitalia as in Figure 6. Abdominal sternum VII with broad, V-shaped mesal excavation; lacking apicomesal process. Segment VIII in lateral view acute posteriorly; sternum VIII with very deep, narrow, V-shaped excavation; tergum VIII with broad, U-shaped excavation. Segment IX narrow, extending anteriorly well into segment VI; tergum IX a narrow, sclerotized ribbonlike band extending posteriorly through segment VIII, its apex recurved. Inferior appendages vestigial. Subgenital plate asymmetrical, developed only on left side, its apex bearing long, narrow, sclerotized arm. Left bilobed process long, thin, apex with stout seta; right bilobed process absent. Phallus short, stout, with narrow, subapicolateral sclerotized strip; apex of phallus membranous, ejaculatory duct protruding.









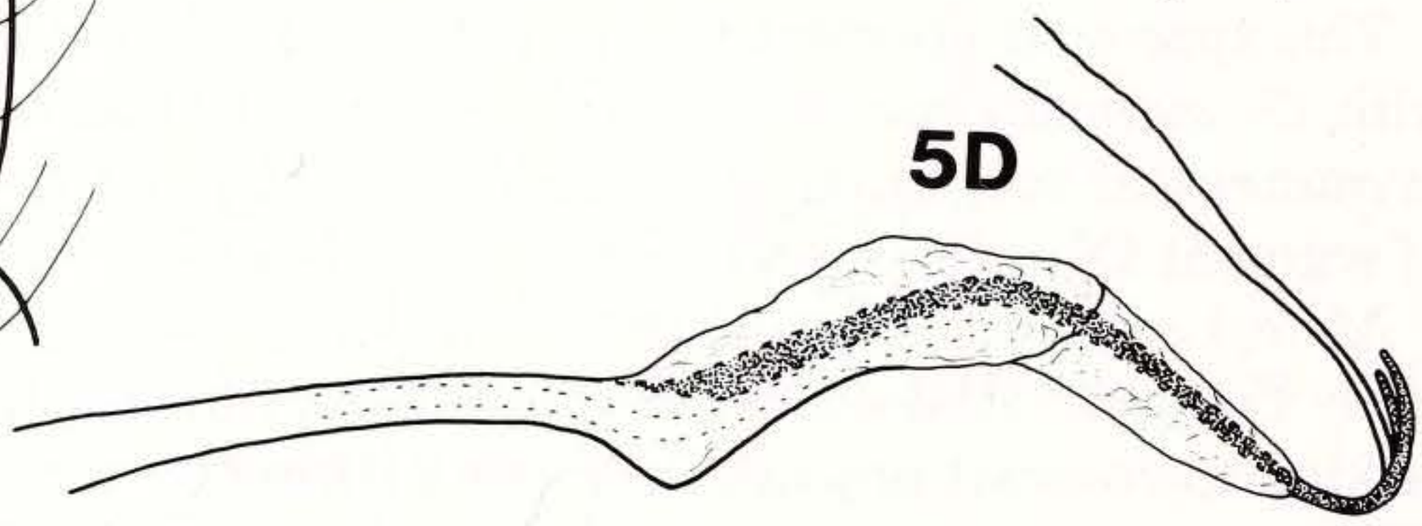


Fig. 5. *Oxyethira hilosa,* new species, male genitalia. A. Lateral. B. Dorsal. C. Ventral. D. Phallus, lateral. E. Phallus, ventral.

Holotype. Male, COSTA RICA: ALAJUELA: Río Pizote, 5 km N Dos Ríos, 10.948°N, 85.291°W, el. 470 m, 9.iii.1986, Holzenthal and Fasth (NMNH).

Paratypes. Same data as holotype, 1 male (INBIO); same, except 5 km (air) S Brasilia, 10.972°N, 85.345°W, el. 390 m, 12.iii.1986, Holzenthal and Fasth, 4 males

(UMSP, UAL); HEREDIA: Quebrada Sura, Est. Biol. La Selva, 10.437°N, 84.010°W, el. 50 m, 20–21.vi.1986, Holzenthal, Heyn, Armitage, 1 male (UMSP).

Etymology. Spanish: "oddity," referring to the unique genitalic structures of this species.

Oxyethira sencilla, new species
Fig. 7

This new species shares similarities with *O. macrosterna* Flint and related species (subgenus *Tanytrichia*), but can be separated from other species in the subgenus by the absence of the lateral phallic processes in the new species.

Male. Length 2.0–2.2 mm. Antennae with 27 segments. Brown in alcohol. Genitalia as in Fig. 7. Abdominal sternum VII with short, apicomesal process. Segment VIII narrow; in lateral view with posterodorsal emarginations; tergum VIII with truncate, mesal excavation and pair of lateral lobes; sternum VIII with deep, U-shaped excavation. Segment IX narrow, tapered, extending anteriorly into segment V. Segment X indistinct, membranous. Inferior appendages short, apices acute; in ventral view widely separated, apices appearing rounded. Subgenital plate in dorsal and ventral views narrow with small apical excision; in lateral view thin, apex narrow. Bilobed processes thin, elongate, each bearing stout apical seta. Phallus short, stout; with pair of sclerotized, distal processes—dorsal one thin, apically acute, median one crescent shaped; phallus when distended truncate distally, with prominent sickle-shaped dorsolateral process.

Holotype. Male, COSTA RICA: ALAJUELA: Río Pizote, 5 km N Dos Ríos, 10.948°N, 85.291°W, el. 470 m, 9.iii.1986, Holzenthal and Fasth (NMNH).

Paratypes. Same data as holotype, 14 males (UMSP, INBIO); same, except 5 km (air) S Brasilia, 10.972°N, 85.345°W, el. 390 m, 12.iii.1986, Holzenthal and Fasth, 2 males (UAL).

Etymology. Spanish: "simple, unadorned," referring to this species' lack of distinct genitalic structures.

Oxyethira sierruca, new species
Fig. 8

This species is most similar to *O. quinquaginta* Kelley (*incertae sedis*, according to Kelley, 1984), with which it shares several atypical characters. These include the many antennal segments, the vestigial inferior appendages, and the asymmetrical dorsal arms of the subgenital plate. The new species is distinguished from its congeners by the serrate margin of segment VIII and the structure of the phallus.

Male. Length 2.6–3.3 mm. Brown in alcohol. Antennae with 45 segments. Abdominal sternum VII with long apicomesal process. Segment VIII with posterodorsal margin serrate, ragged; sternum VIII extended posteriorly; in ventral view with deep, quadrate excavation and rounded lateral lobes; tergum VIII with small, shallow, rounded excavation. Segment IX narrow in lateral view, rounded anteriorly in dorsal and ventral views; extending anteriorly into segment VII; tergum IX reduced to thin band. Inferior appendages vestigial. Subgenital plate reduced to rounded mesal lobe, but with pair of prominent, asymmetrical dorsal arms—left arm with wide apex

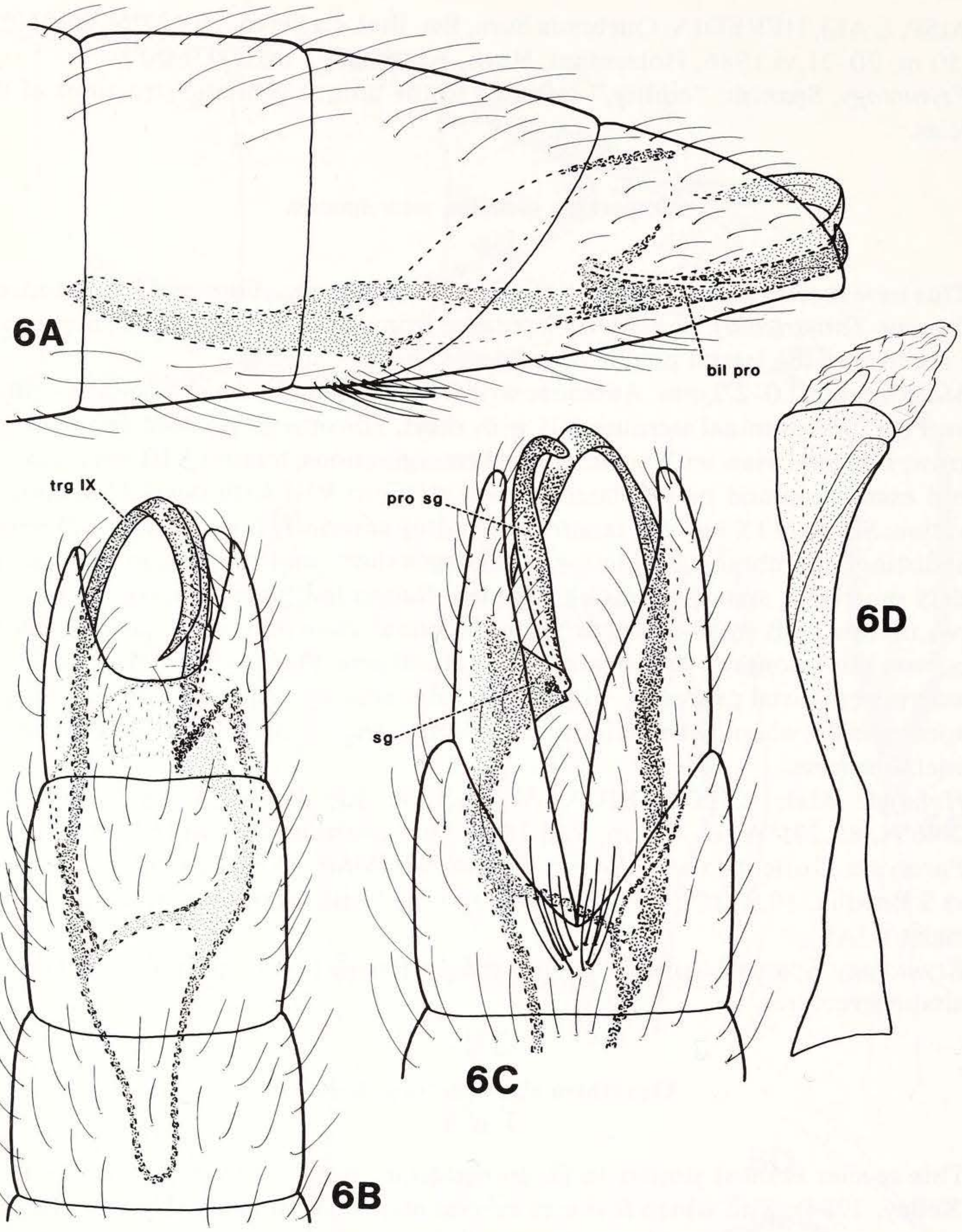
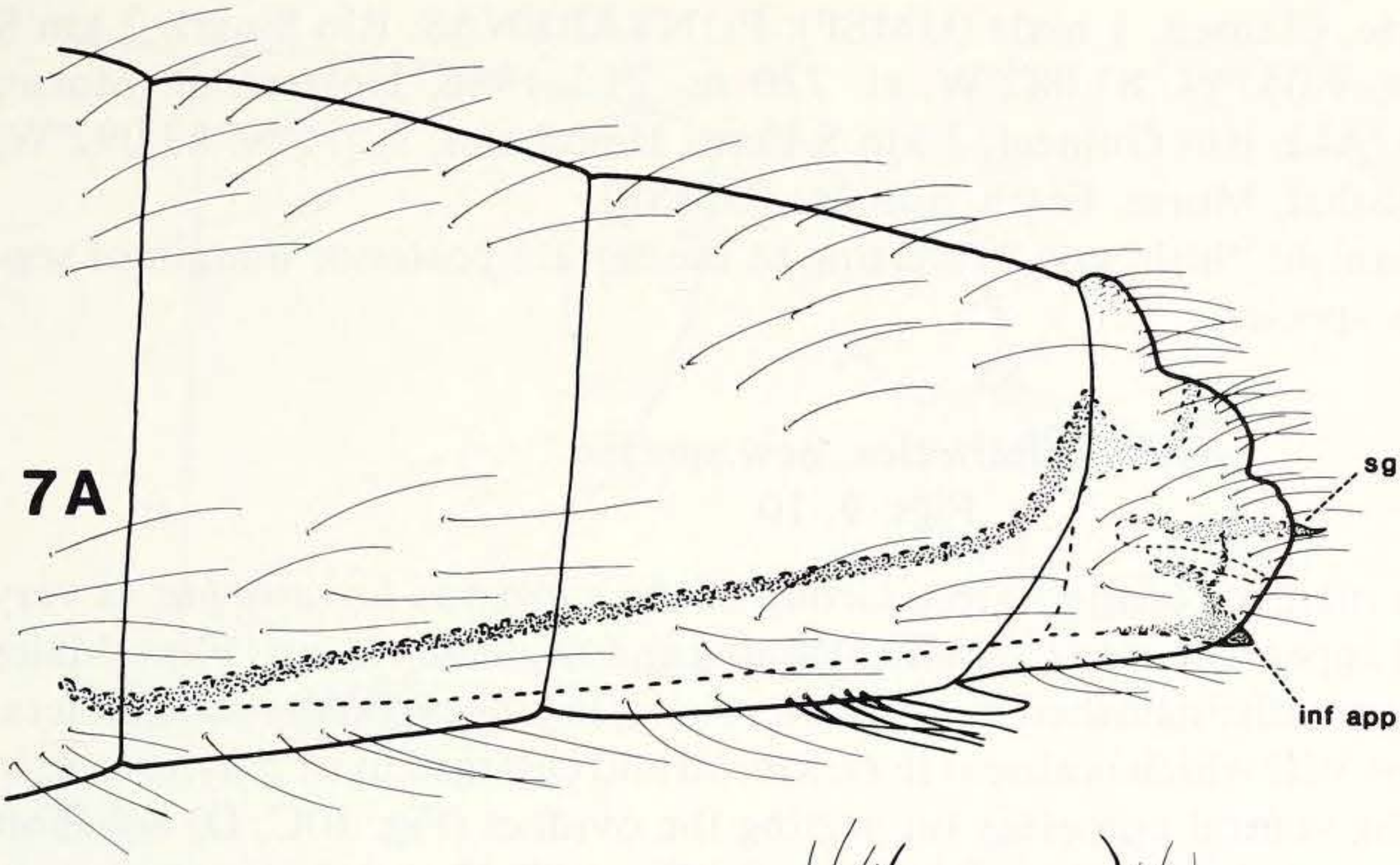


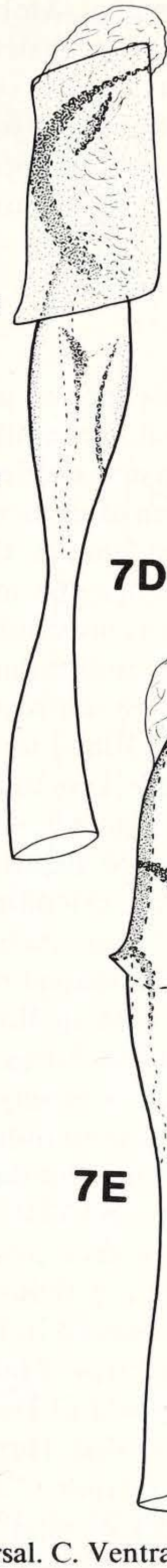
Fig. 6. *Oxyethira rareza,* new species, male genitalia. A. Lateral. B. Dorsal. C. Ventral. D. Phallus, lateral. Abbreviations: bil pro = bilobed process; pro sg = process of subgenital plate; sg = subgenital plate; trg IX = tergum IX.

bearing mesal excavation, right arm rectangular, sinuate along mesal margin. Bilobed processes lacking. Phallus short, stout; with pair of lateral, sclerotized rods—left rod thick, curving dorsally; right rod angled at midlength, subapicoventral margin serrate.

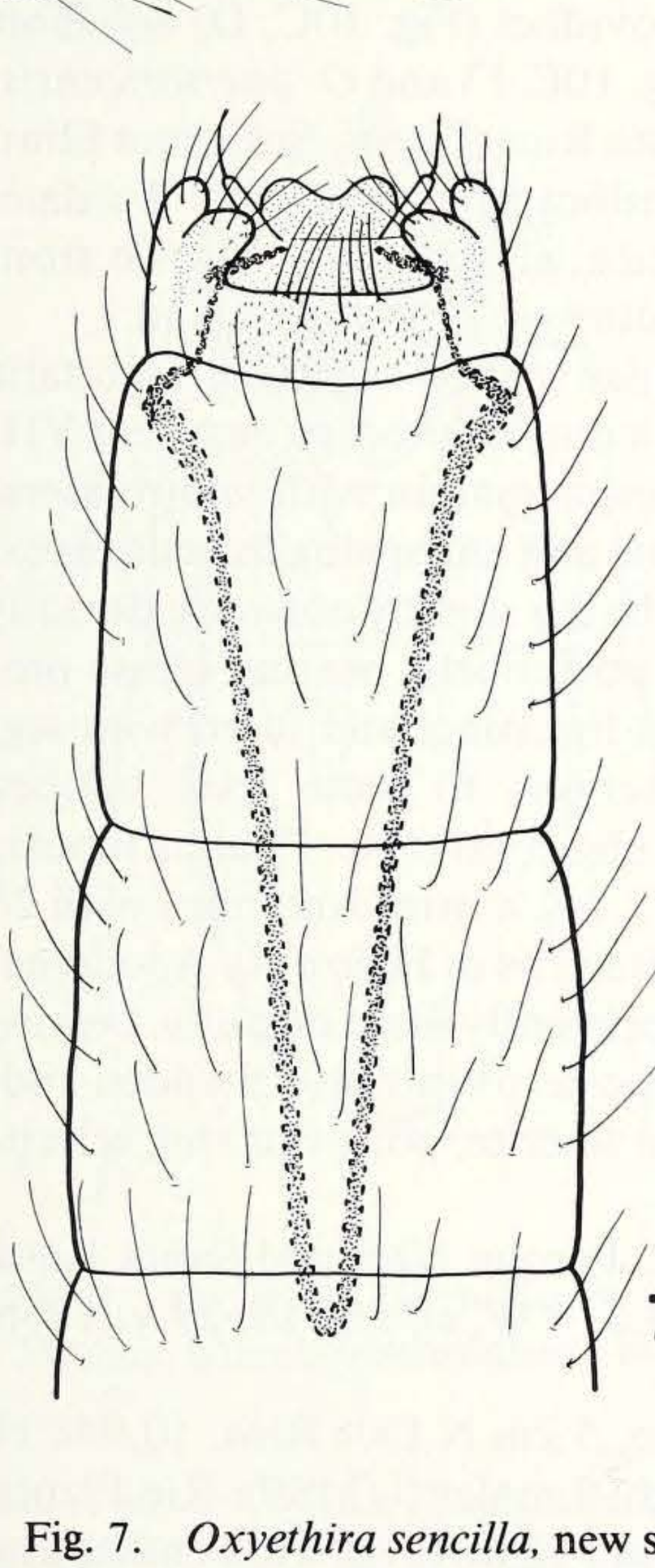
Holotype. Male, COSTA RICA: GUANACASTE: Quebrada Garcia, 10.6 km ENE Quebrada Grande, 10.862°N, 85.428°W, el. 470 m, 8.iii.1986, Holzenthal and Fasth (NMNH).



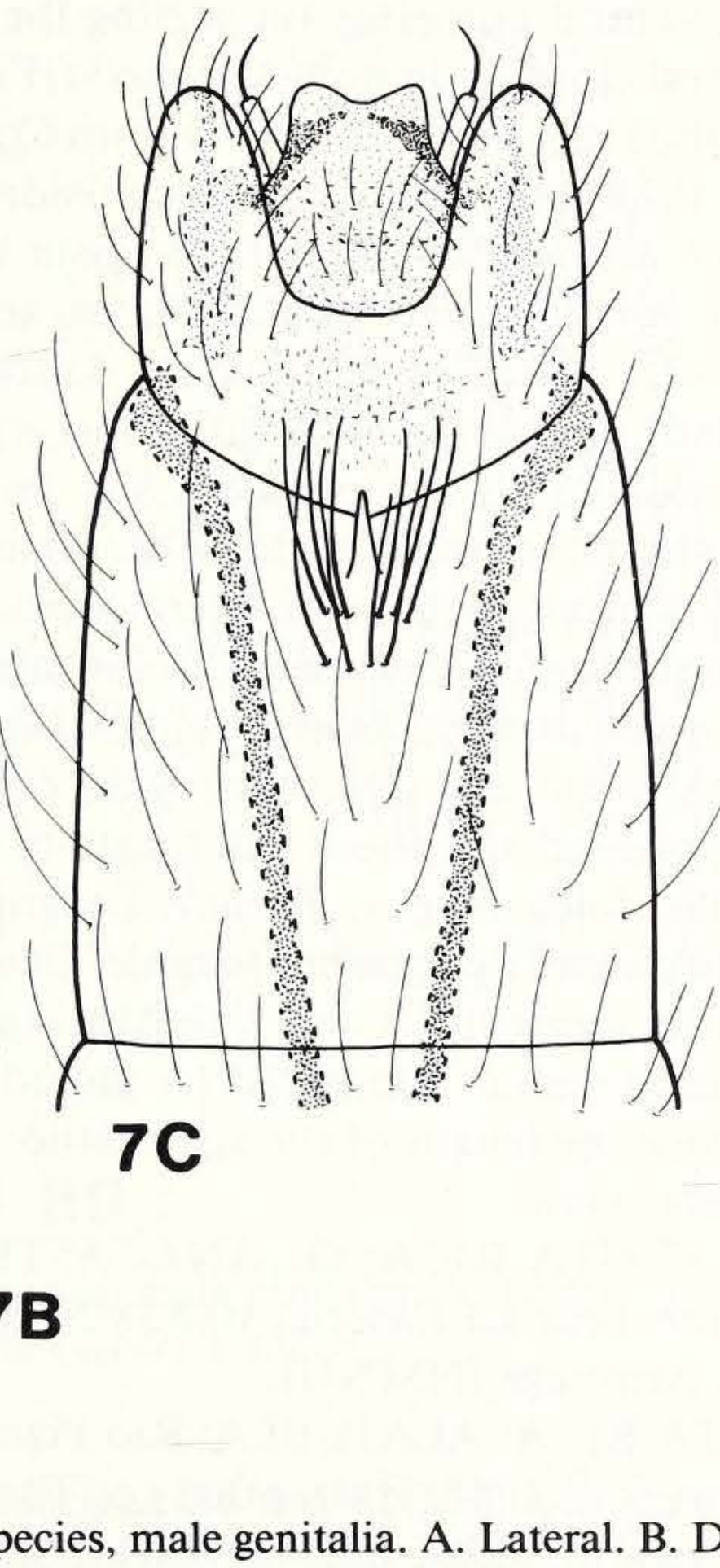
7A



7D



7B



7C

7E

Fig. 7. *Oxyethira sencilla,* new species, male genitalia. A. Lateral. B. Dorsal. C. Ventral. D. Phallus, lateral. E. Phallus, ventral. Abbreviations as in Figures 1 and 2.

Paratypes. Same data as holotype, 96 males (UMSP); ALAJUELA: Reserva Forestal San Ramón, Río San Lorencito and tribs., 10.216°N, 84.607°W, el. 980 m, 30.iii–1.iv.1987, Holzenthal, Hamilton, Heyn, 7 males (INBIO); CARTAGO: Quebrada Plantanillo, 5 km E Moravia de Chirripó, 9.821°N, 83.407°W, el. 1,130 m, 7.viii.1987,

Holzenthal, Morse, Clausen, 1 male (UMSP); PUNTARENAS: Río Singrí, 2 km S Finca Helechales, 9.057°N, 83.082°W, el. 720 m, 21.ii.1986, Holzenthal, Morse, Fasth, 2 males (UAL); Río Guineal, 1 km S Finca Helechales, 9.076°N, 83.092°W, el. 840 m, Holzenthal, Morse, Fasth, 3 males (UMSP).

Etymology. Spanish: "little saw," referring to the serrate posterior margin of segment VIII of this species.

Oxyethira tica, new species
Figs. 9, 10

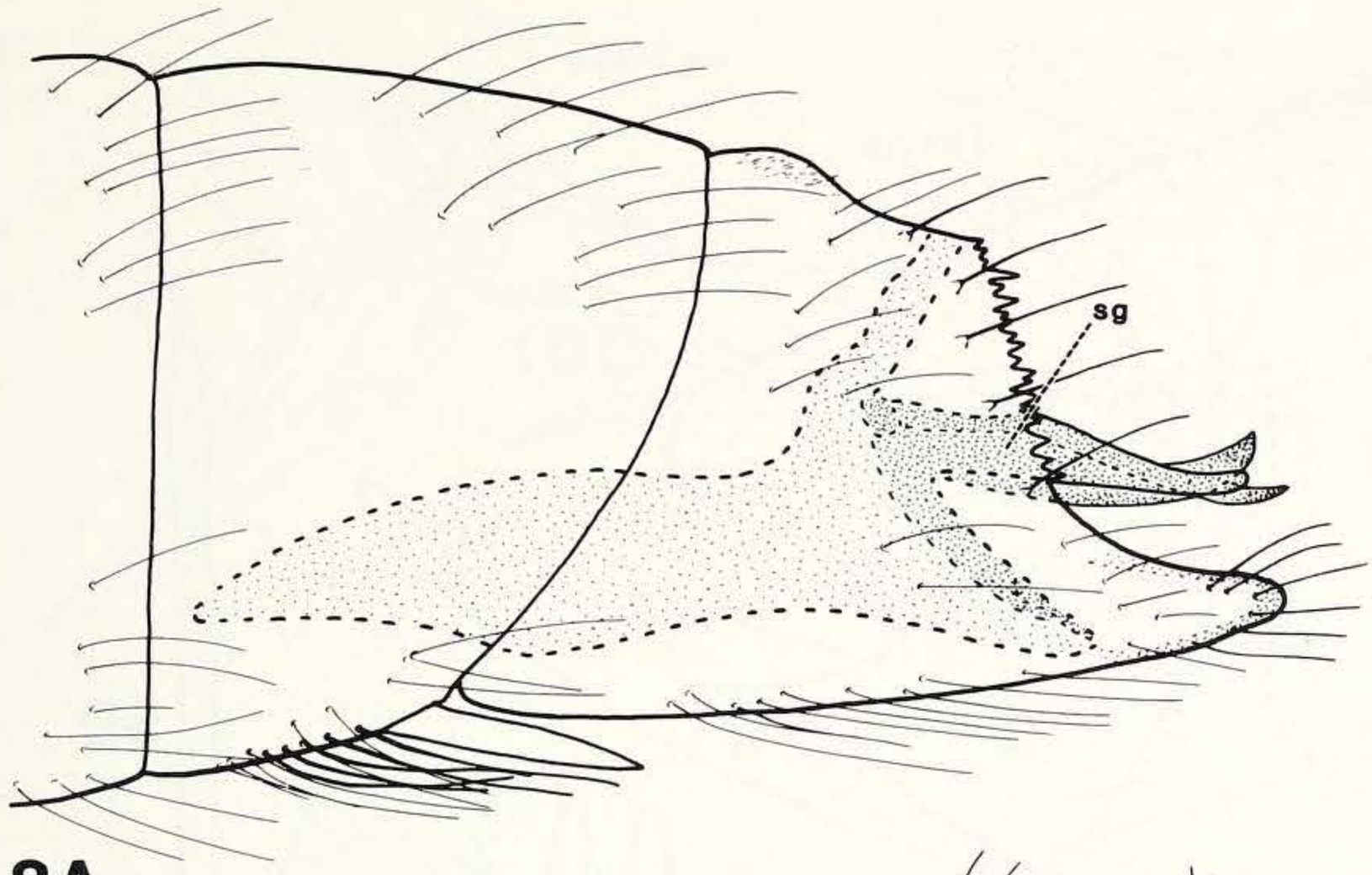
This species, a member of the Azteca Group of the subgenus *Loxotrichia,* is very similar in overall appearance to *O. janella* Denning and *O. puertoricensis* Flint. Males of the new species are distinguished by the acute, elongate process on the ventrolateral margin of segment VIII which is absent in *O. janella* and enlarged in *O. puertoricensis.* In the females, the ventral processes supporting the oviduct (Fig. 10C, D) are short in the new species and elongate in both *O. janella* (Fig. 10E, F) and *O. puertoricensis.*

Previously published records of *O. janella* from Costa Rica (Bueno-Soria and Flint, 1978; Holzenthal, 1988) probably represent misidentifications of *O. tica.* To date, we have not seen *O. janella* from mainland Costa Rica, although it is known from Cocos Island in the Pacific Ocean, about 500 km southwest of the mainland.

Male. Length 2.2–3.1 mm. Brown in alcohol. Antennae with 34 segments. Genitalia as in Figure 9. Abdominal sternum VII with short, apicomesal process. Segment VIII produced slightly midlaterally into segment VII, anterior margin with ventrolateral process, extending almost to length of dorsolateral lobe and narrowing to acute apex; VIII deeply excised ventrally with acute lateral lobes flaring slightly outward; dorsally with U-shaped mesal excision. Segment IX elongate posteriorly, bearing setose process, with shallow notch at apex. Inferior appendages indistinct and fused with segment IX. Subgenital plate elongate, narrowing posteriorly to acute apex; bilobed processes closely appressed and about half length of subgenital plate. Phallus tubular with several indistinct folds at apex. *Female.* Length 2.2–2.4 mm. Antennae with 25 segments. Similar in overall appearance to male. Genitalia as in Figure 10. Apodemes of segment VIII short. Segments IX and X short and apparently fused dorsally, bearing pair of cerci at apex. Oviduct supported by paired posteroventrally extended rods which are about twice the length of the spermathecal sclerite; posterior ring sclerite thin, curved in lateral view.

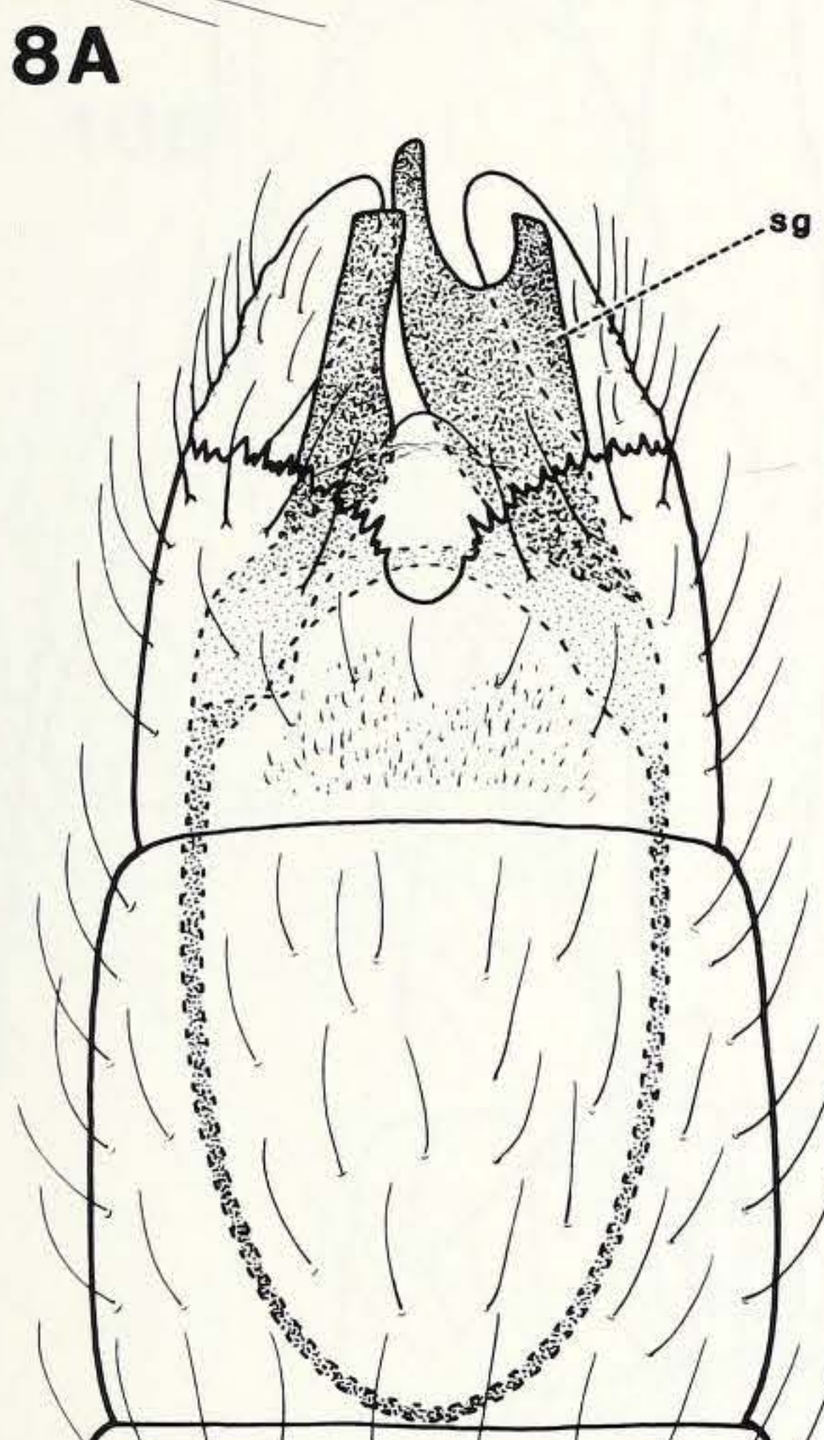
Holotype. Male, COSTA RICA: GUANACASTE: Parque Nacional Santa Rosa, Quebrada El Duende, near La Casona, 10.838°N, 85.614°W, el. 280 m, 29.vi.1986, Holzenthal, Heyn, Armitage (NMNH).

Paratypes. COSTA RICA: ALAJUELA: Río Pizote, 5 km N Dos Rios, 10.948°N, 85.291°W, el. 470 m, 9.iii.1986, Holzenthal and Fasth, 2 males (UMSP); Río Pizote, 5 km (air) S Brasilia, 10.972°N, 85.345°W, el. 390 m, 12.iii.1986, Holzenthal and Fasth, 17 males (UMSP). GUANACASTE: Parque Nacional Rincón de la Vieja, Quebrada Agua Apinolada, 10.759°N, 85.292°W, el. 795 m, 25.vi.1986, Holzenthal, Heyn, Armitage, 2 males (INBIO); Parque Nacional Guanacaste, Estación Pitilla, Río Orosí, 10.991°N, 85.428°W, el. 700 m, 19–20.vi.1988, C. M. and O. S. Flint, R. Holzenthal, 1 male (INBIO); Parque Nacional Guanacaste, El Hacha, Quebrada Alcornoque, 11.009°N, 85.577°W, el. 250 m, 26.vii.1987, Holzenthal, Morse, Clau-

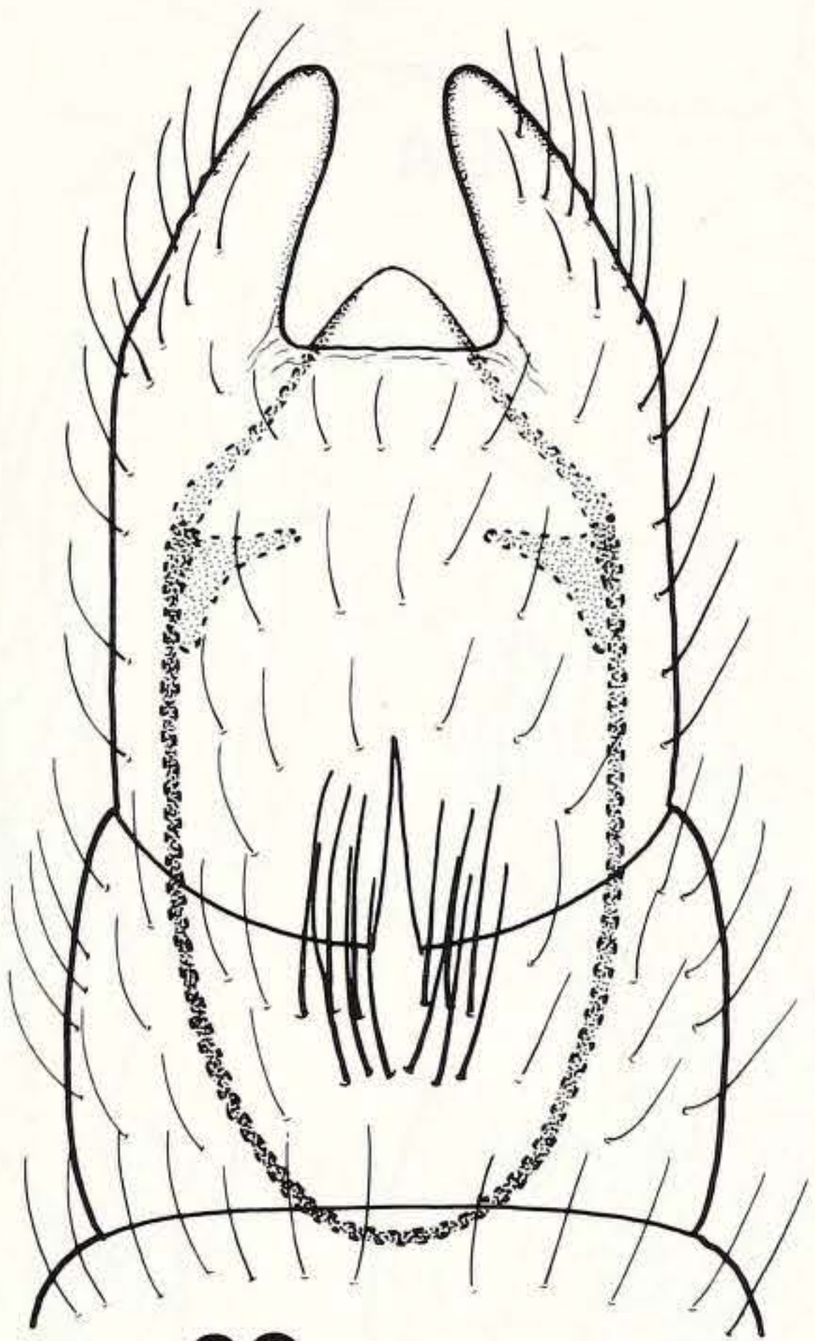


8A

8D



8B



8C

Fig. 8. *Oxyethira sierruca,* new species, male genitalia. A. Lateral. B. Dorsal. C. Ventral. D. Phallus, lateral. Abbreviations as in Figures 1 and 2.

sen, 1 male (UAL); Quebrada Garcia, 10.6 km ENE Quebrada Grande, 10.862°N, 85.428°W, el. 470 m, 8.iii.1986, Holzenthal and Fasth, 1 male (UAL); Río Los Ahogados, 11.3 km ENE Quebrada Grande, 10.865°N, 85.423°W, el. 470 m, 7.iii.1986, Holzenthal and Fasth, 2 males (UMSP); Río Mena, 4.2 km W Santa Cecilia, 11.059°N, 85.448°W, el. 260 m, 11.iii.1986, Holzenthal and Fasth, 1 male (UMSP); Río Tempisquito, 3 km S route 1, 10.790°N, 85.552°W, el. 75 m, 6.iii.1986, Holzenthal and Fasth, 1 male (UMSP); Río Tizate, 7.2 km NE Cañas Dulces, 10.773°N, 85.449°W, el. 275 m, 28.vi.1986, Holzenthal, Heyn, Armitage, 1 male (UMSP). HEREDIA:

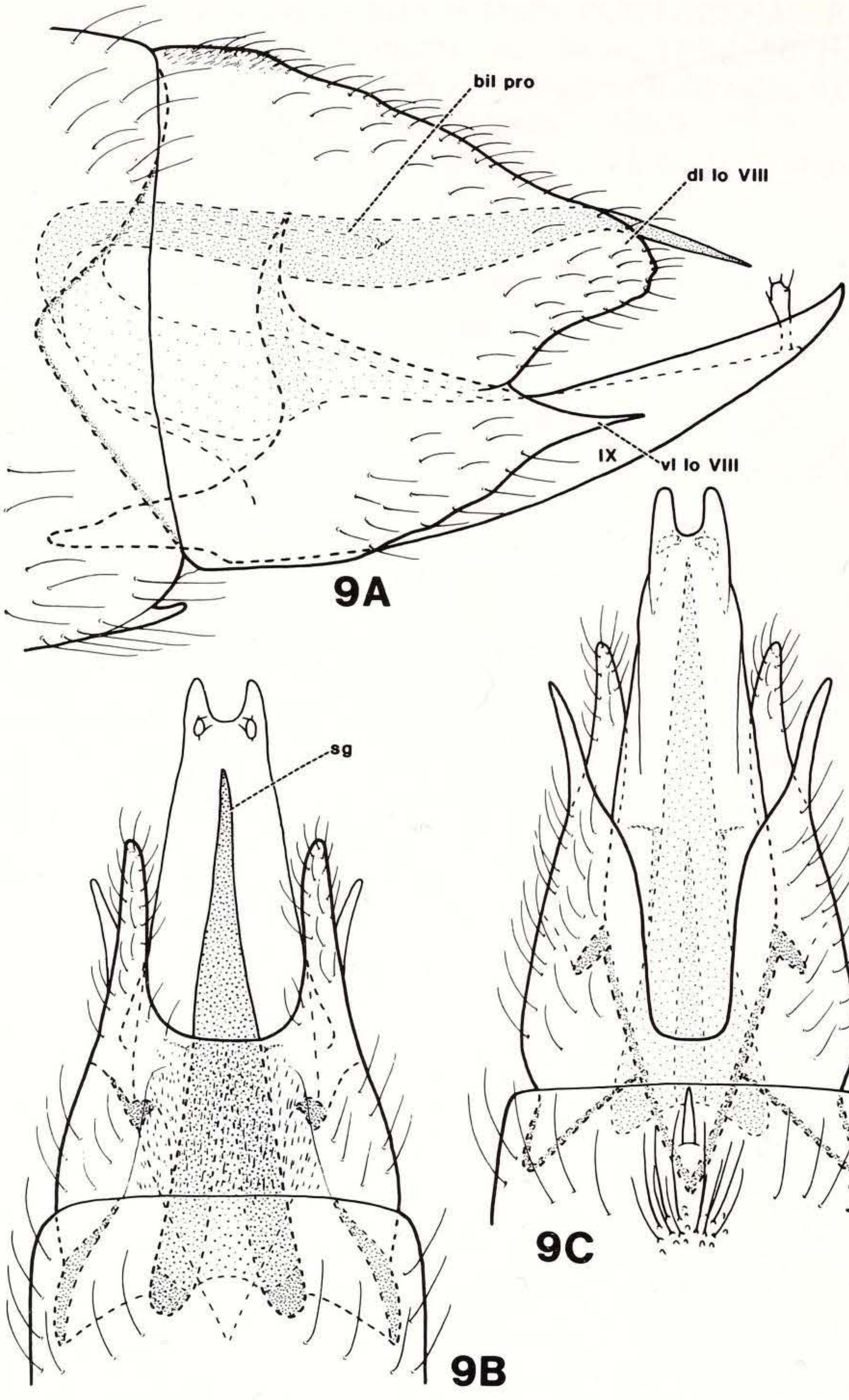
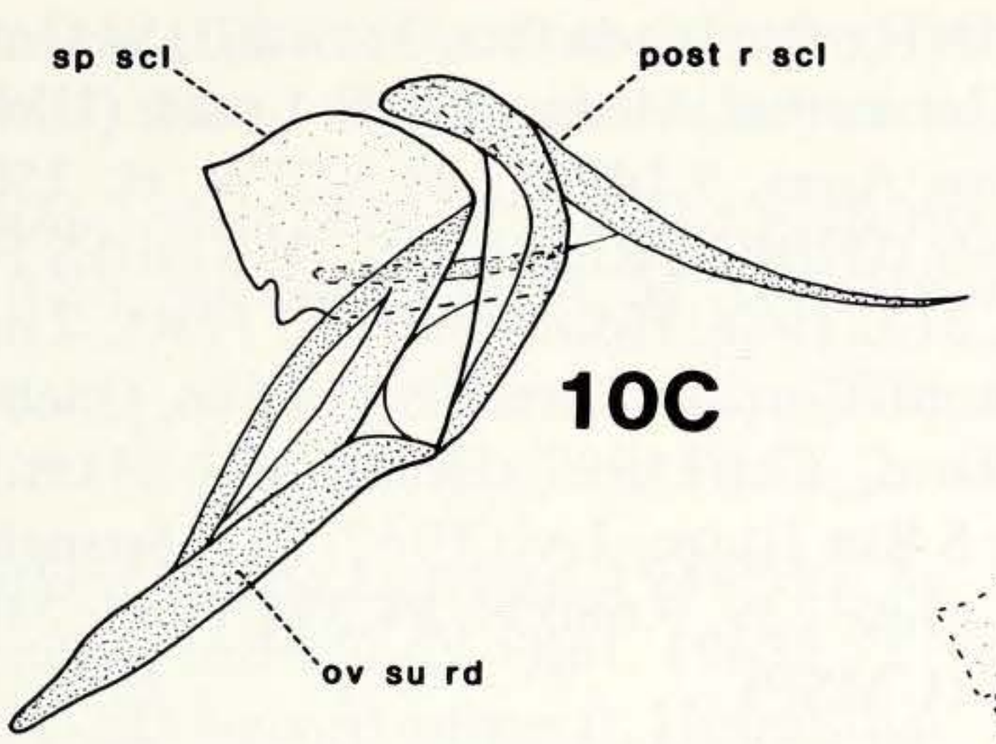
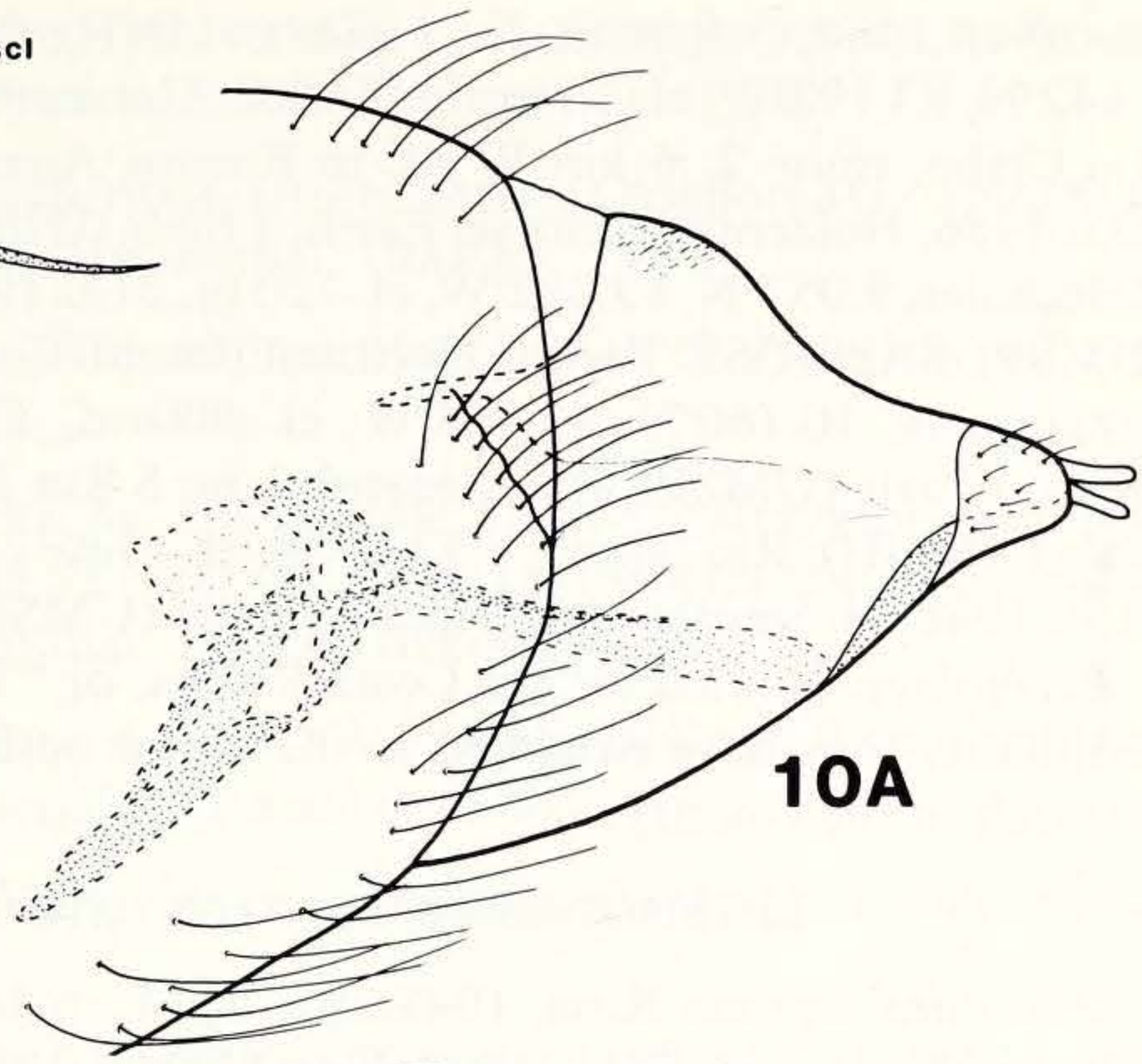


Fig. 9. *Oxyethira tica,* new species, male genitalia. A. Lateral. B. Dorsal. C. Ventral. D. Phallus, lateral. Abbreviations: dl lo VIII = dorsolateral lobe of segment VIII; vl lo VIII = ventrolateral lobe of segment VIII; others as in Figure 2.

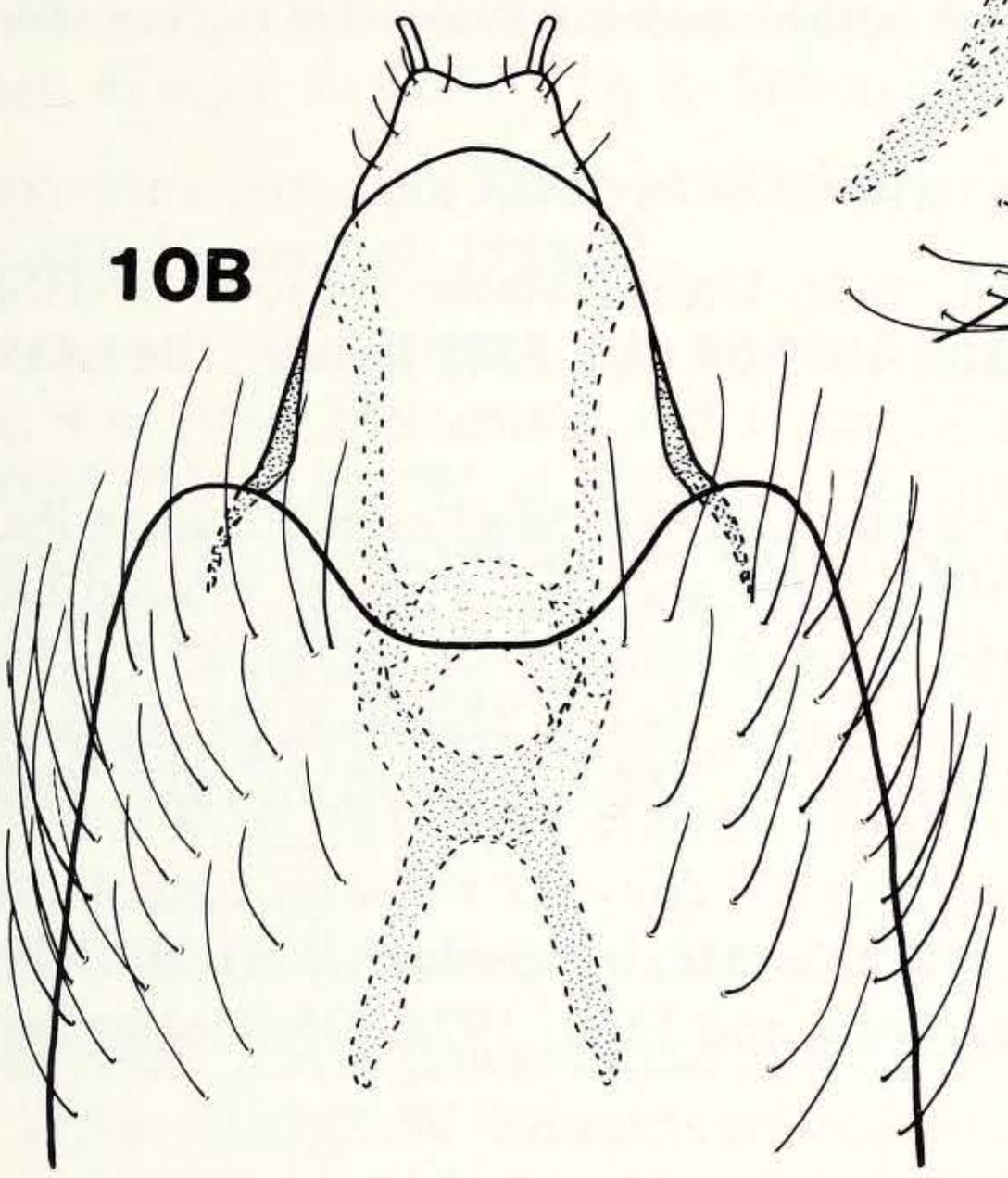
Río Bijagual on road to Magsasay, 10.408°N, 84.076°W, el. 140 m, 12.ii.1986, Holzenthal, Morse, Fasth, 1 male (UMSP). LIMON: Río Telire and small tribs., SE Suretka, 9.554°N, 82.892°W, el. 48 m, 1.ii.1986, Holzenthal, Morse, Fasth, 1 male (UMSP); Río Uatsi, 8 km (air) W Bribrí, 9.62°N, 82.90°W, el. 60 m, 25.iii.1987, Holzenthal, Hamilton, Heyn, 5 males (UMSP). PUNTARENAS: 2.8 mi E of Golfito,



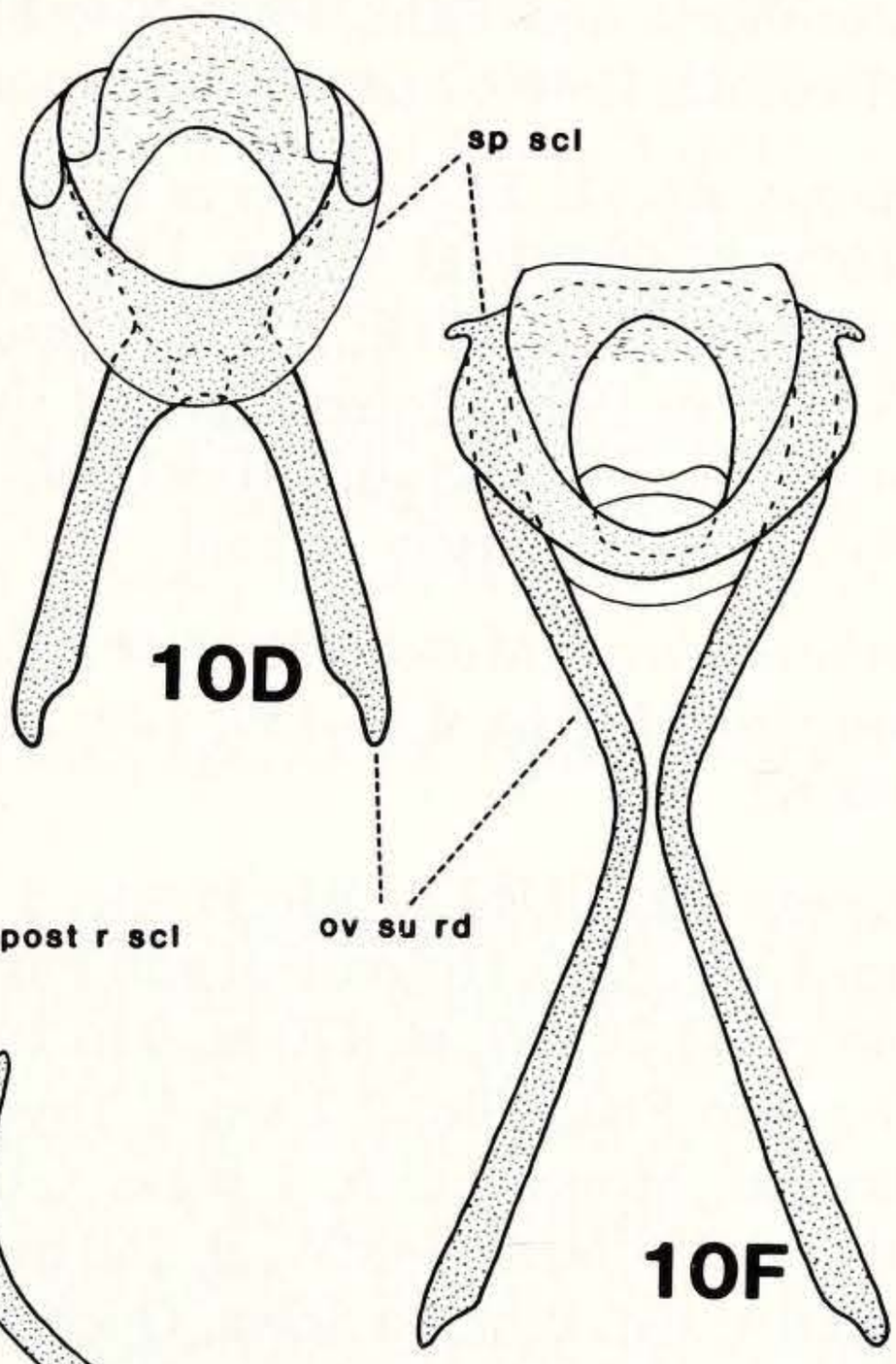
10C



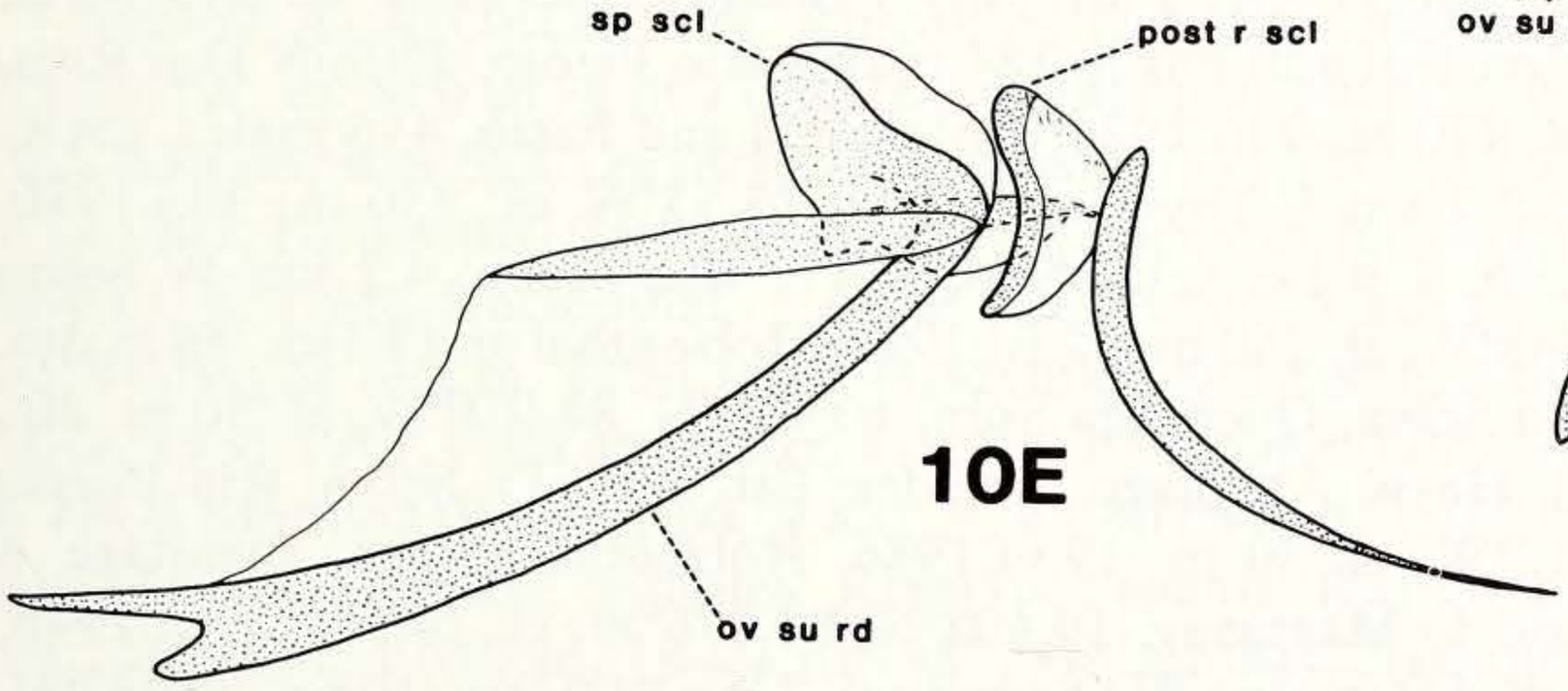
10A



10B



10D



10E

10F

Fig. 10. *Oxyethira* spp., female genitalia. A–D. *Oxyethira tica,* new species. A. Lateral. B. Ventral. C. Internal sclerites, lateral. D. Same, ventral. E–F. *Oxyethira janella* Denning. E. Internal sclerites, lateral. F. Same, ventral. Abbreviations: ov su rd = oviduct support rod; post r scl = posterior ring sclerite; sp scl = spermathecal sclerite.

18–19.vii.1967, O. S. Flint, Jr., 1 male (NMNH); Quebrada Pita, 3 km (air) W Golfito, 8.642°N, 83.193°W, el. 15 m, 15.ii.1986, Holzenthal, Morse, Fasth, 1 male (UMSP); Río Ceibo, route 2, 6 km W rd. to Buenos Aires, 9.149°N, 83.377°W, el. 250 m, 20.ii.1986, Holzenthal, Morse, Fasth, 1 male (INBIO); Río Singrí, 2 km (air) S Finca Helechales, 9.057°N, 83.082°W, el. 720 m, 21.ii.1986, Holzenthal and Fasth, 2 males (UMSP). SAN JOSÉ: Parque Nacional Braulio Carrillo, Estación Carrillo, Quebrada Sanguijuela, 10.160°N, 83.963°W, el. 800 m, 27.iii.1987, Holzenthal, Hamilton, Heyn, 1 male (UMSP); Río General, 1 mi S San Isidro, 1.vii.1967, P. J. Spangler, 1 male (NMNH); Río Negro, 3.5 km SE jct. route 239, 9.680°N, 84.394°W, el. 230 m, 21.iii.1986, Holzenthal and Fasth, 1 male (UMSP).

Etymology. Named for the Costa Ricans, or "Ticos," in recognition of the warm hospitality they have extended to the senior author and his associates during their research in the country.

DISTRIBUTION RECORDS FOR *OXYETHIRA* IN COSTA RICA

Oxyethira arizona Ross, 1948:202, fig. 4, male, United States: Arizona (INHS); Bueno-Soria and Flint, 1978:204; Blickle, 1979:54, fig. 158; Kelley, 1984:439; Holzenthal, 1988:62 (*arizonica, lapsus*).

Records. ALAJUELA: Reserva Forestal San Ramón, Río San Lorencito and tribs., 10.216°N, 84.607°W, el. 980 m, 13–16.vi.1988, C. M. and O. S. Flint, R. Holzenthal, 1 male. GUANACASTE: Río Tempisquito, 3 km S route 1, 10.790°N, 85.552°W, el. 75 m, 6.iii.1986, Holzenthal and Fasth, 2 males; Parque Nacional Guanacaste, Maritza, Río Tempisquito, 10.958°N, 85.497°W, el. 550 m, 19–20.vii.1987, Holzenthal, Morse, Clausen, 1 male.

Oxyethira azteca (Mosely) 1937:165, fig. 13, male, Mexico (*Loxotrichia*) (BMNH); Flint, 1968:54, fig. 138–139, 149; Bueno-Soria and Flint, 1978:205; Holzenthal, 1988:62.

Records. ALAJUELA: Río Pizote, 5 km (air) S Brasilia, 10.972°N, 85.345°W, el. 390 m, 12.iii.1986, Holzenthal and Fasth, 184 males; Río Pizote, 5 km N Dos Rios, 10.948°N, 85.291°W, el. 470 m, 9.iii.1986, Holzenthal and Fasth, 446 males. CARTAGO: Río Platanillo, 2.2 km E Tayutic, 9.82°N, 83.55°W, el. 730 m, 30.i.1986, Holzenthal, Morse, Fasth, 1 male. GUANACASTE: Río Mena, 4.2 km W Santa Cecilia, 11.059°N, 85.448°W, el. 260 m, 11.iii.1986, Holzenthal and Fasth, 46 males. HEREDIA: Est. Biol. La Selva, Quebrada Sura, 10.437°N, 84.010°W, el. 50 m, 20–21.vi.1986, Holzenthal, Heyn, Armitage, 7 males; Est. Biol. La Selva, Río Puerto Viejo, 10.440°N, 84.012°W, el. 30 m, 19.vi.1986, Holzenthal, Heyn, Armitage, 4 males; Río Bijagual, road to Magsasay, 10.408°N, 84.076°W, el. 140 m, 12.ii.1986, Holzenthal, Morse, Fasth, 536 males; Río Sarapiquí, 7 km W Puerto Viejo, 10.452°N, 84.067°W, el. 50 m, 11.ii.1986, Morse and Fasth, 18 males. PUNTARENAS: Río Ceibo, route 2, 6 km W rd. to Buenos Aires, 9.149°N, 83.377°W, el. 250 m, 20.ii.1986, Holzenthal, Morse, Fasth, 76 males; Río Singrí, 2 km (air) S Finca Helechales, 9.057°N, 83.082°W, el. 720 m, 21.ii.1986, Holzenthal, Morse, Fasth, 3 males; SAN JOSE: Río General, 1 mi S San Isidro, 1.vii.1967, P. J. Spangler, 5 males (NMNH).

Oxyethira costaricensis Kelley, 1983:44, fig. 4, male, Costa Rica (NMNH); Holzenthal, 1988:62.

Record. HEREDIA: Los Cartagos, 24.vi.1967, P. J. Spangler, male holotype (NMNH). Note: This species is known only from the male holotype.

Oxyethira glasa (Ross) 1941:70, fig. 28, male, United States: Oklahoma (*Loxotrichia*) (INHS); Blickle, 1979:54, fig. 160; Holzenthal, 1988:63.

Records. ALAJUELA: Río Pizote, 5 km N Dos Rios, 10.948°N, 85.291°W, el. 470 m, 9.iii.1986, Holzenthal and Fasth, 2 males.

Oxyethira janella Denning, 1948:397, fig. 2A–B, male, United States: Florida (D. G. Denning collection); Flint, 1968a:52, figs. 136–137, 148; Bueno-Soria and Flint, 1978:205 (record suspect); Holzenthal, 1988:63 (record suspect).

Record. COSTA RICA: Isla del Coco: 500 km SW [mainland] Costa Rica, Chatham Bay, at light, 8–10.iv.1979, R. Silberglied, 1 male (LACM).

Oxyethira parazteca Kelley, 1983:53, fig. 16, male, Ecuador (NMNH); Kelley, 1984: 442; Holzenthal, 1988:63.

Records. ALAJUELA: Río Pizote, 5 km N Dos Rios, 10.948°N, 85.291°W, el. 470 m, 9.iii.1986, Holzenthal and Fasth, 20 males; Río Pizote, 5 km (air) S Brasilia, 10.972°N, 85.345°W, el. 390 m, 12.iii.1986, Holzenthal and Fasth, 3 males. CARTAGO: Quebrada Platanillo, 5 km E Moravia de Chirripó, 9.821°N, 83.407°W, el. 1,130 m, 7.viii.1987, Holzenthal, Morse, Clausen, 2 males; Río Platanillo, 2.2 km E Tayutic, 9.82°N, 83.55°W, el. 730 m, 30.i.1986, Holzenthal, Morse, Fasth, 2 males. GUANACASTE: P.N. Rincón de la Vieja, Quebrada Agua Apinolada, 10.759°N, 85.292°W, el. 795 m, 25.vi.1986, Holzenthal, Heyn, Armitage, 38 males; Río Góngora (sulfur mine), 4 km (air) NE Quebrada Grande, 10.887°N, 85.470°W, el. 590 m, 21.vii.1987, Holzenthal, Morse, Clausen, 4 males.

Oxyethira parce (Edwards and Arnold) 1961:405, figs. 23–25, United States: Texas (*Protoptila*) (S. W. Edwards collection).

Records. ALAJUELA: P.N. Rincón de la Vieja, Quebrada Provisión, 10.769°N, 85.281°W, el. 810 m, 4.iii.1986, Holzenthal and Fasth, 3 males; Reserva Forestal San Ramón, Río San Lorencito and tribs., 10.216°N, 84.607°W, el. 980 m, 30.iii–1.iv.1987, Holzenthal, Hamilton, Heyn, 2 males; same, except 13–16.vi.1988, C. M. and O. S. Flint, Holzenthal, 1 male; Río Pizote, 5 km (air) S Brasilia, 10.972°N, 85.345°W, el. 390 m, 12.iii.1986, Holzenthal and Fasth, 2 males. CARTAGO: Chitaría, 19.vi.1967, Flint and Ortiz, 4 males, 10 females (NMNH); Quebrada Platanillo, 5 km E Moravia de Chirripó, 9.821°N, 83.407°W, el. 1,130 m, 7.viii.1987, Holzenthal, Morse, Clausen, 5 males; Reserva Tapantí, Río Grande de Orosí, 9.686°N, 83.756°W, el. 1,650 m, 18–21.iii.1987, Holzenthal, Hamilton, Heyn, 1 male; Turrialba, 26.viii.1972, G. F. and S. Hevel, 1 male, 1 female (NMNH). GUANACASTE: Parque Nacional Guanacaste, Estación Pitilla, Río Orosí, 10.99°N, 85.428°W, el. 700 m, 19–20.vi.1988, C. M. and O. S. Flint, Holzenthal, 16 males, 8 females; P.N. Rincón de la Vieja, Quebrada Agua Apinolada, 10.759°N, 85.292°W, el. 795 m, 25.vi.1986, Holzenthal, Heyn, Armitage, 2 males; P.N. Santa Rosa, Quebrada El Duende, nr La Casona, 10.838°N, 85.614°W, el. 280 m, 29.vi.1986, Holzenthal, Heyn, Armitage, 1 male; Quebrada Garcia, 10.6 km ENE Quebrada Grande, 10.862°N, 85.428°W, el. 470 m, 8.iii.1986, Holzenthal and Fasth, 2 males; Río Góngora (sulfur

mine), 4 km (air) NE Quebrada Grande, 10.887°N, 85.470°W, 21.vii.1987, Holzenthal, Morse, Clausen, 2 males; Río Tizate, 7.2 km NE Cañas Dulces, 10.773°N, 85.449°W, el. 275 m, 28.vi.1986, Holzenthal, Heyn, Armitage, 11 males. HEREDIA: Río Bijagual, road to Magsasay, 10.408°N, 84.076°W, el. 140 m, 12.ii.1986, Holzenthal, Morse, Fasth, 17 males. LIMON: La Lola near Matina, 11.iii.1965, S. and W. D. Duckworth, 1 male (NMNH); Reserva Biol. Hitoy-Cerere, Río Cerere, 9.671°N, 83.028°W, el. 90 m, 23–24.iii.1987, Holzenthal, Hamilton, Heyn, 27 males; Río Banano, 16 km WSW Bomba, 9.888°N, 83.167°W, el. 150 m, 26.iii.1987, Holzenthal, Hamilton, Heyn, 3 males; Río Telire and small tribs., SE Suretka, 9.554°N, 82.892°W, el. 48 m, 1.ii.1986, Holzenthal, Morse, Fasth, 11 males. PUNTARENAS: 2.8 mi E Golfito, 18–19.vii.1967, O.S. Flint, Jr., 3 males, 7 females (NMNH); Quebrada Pita, 3 km (air) W Golfito, 8.642°N, 83.193°W, el. 15 m, 15.ii.1986, Holzenthal, Morse, Fasth, 28 males; Río Bellavista, 1.5 km NW Las Alturas, 8.951°N, 82.846°W, el. 1,400 m, 8–9.iv.1987, Holzenthal, Hamilton, Heyn, 31 males; Río Ceibo, route 2, 6 km W rd. to Buenos Aires, 9.149°N, 83.377°W, el. 250 m, 20.ii.1986, Holzenthal, Morse, Fasth, 27 males; Río Cotón in Las Alturas, 8.938°N, 82.826°W, el. 1,360 m, 16.ii.1986, Holzenthal, Morse, Fasth, 1 male; Río Guineal, 1 km (air) E Finca Helechales, 9.076°N, 83.092°W, el. 840 m, 22.ii.1986, Holzenthal, Morse, Fasth, 14 males; Río Jaba at rock quarry, 1.4 km (air) W Las Cruces, 8.79°N, 82.97° W, el. 1,150 m, 14.vi.1986, Holzenthal, Heyn, Armitage, 23 males; Río Jaba, 2.4 km (air) NW San Vito, 8.832°N, 82.991°W, el. 970 m, 13.vi.1986, Holzenthal, Heyn, Armitage, 5 males; Río Singrí, 2 km (air) S Finca Helechales, 9.057°N, 83.082°W, el. 720 m, 21.ii1986, Holzenthal, Morse, Fasth, 73 males. SAN JOSE: Pacuare, Río General, 1.vii. 1967, Flint and Ortiz, 2 males, 5 females (NMNH); Río General, 1 mi S San Isidro, 1.vii.1967, P. J. Spangler, 9 males, 27 females (NMNH); Río Negro, 3.5 km SE jct. route 239, 9.68°N, 84.394°W, el. 230 m, 21.iii.1986, Holzenthal and Fasth, 1 male.

Oxyethira simulatrix Flint, 1968:43, figs. 89–91, 99, male, Jamaica (NMNH); Holzenthal, 1988:63.

Records. GUANACASTE: Parque Nacional Guanacaste, Maritza, Río Tempisquito, 10.958°N, 85.497°W, el. 550 m, 19–20.vii.1987, Holzenthal, Morse, Clausen, 1 male; Río Tempisquito, 3 km S route 1, 10.790°N, 85.522°W, el. 75 m, 6.iii.1986, Holzenthal and Fasth, 1 male. LIMON: Río Telire and small tribs., SE Suretka, 9.554°N, 82.892°W, el. 48 m, 1.ii.1986, Holzenthal, Morse, Fasth, 11 males. PUNTARENAS: Río Ceibo, route 2, 6 km W rd. to Buenos Aires, 9.149°N, 83.377°W, el. 250 m, 20.ii.1986, Holzenthal, Morse, Fasth, 1 male; Río Singrí, 2 km (air) S Finca Helechales, 9.057°N, 83.082°W, el. 720 m, 21.ii.1986, Holzenthal, Morse, Fasth, 1 male. SAN JOSE: P.N. Braulio Carrillo, Quebrada Sanguijuela, Est. Carrillo, 10.160°N, 83.963°W, el. 800 m, 27.iii.1987, Holzenthal, Hamilton, Heyn, 1 male; Río General, 1 mi S San Isidro, 1.vii.1967, P. J. Spangler, 1 male (NMNH).

KEY TO MALES OF COSTA RICAN *OXYETHIRA*

1. Inferior appendages absent or vestigial (Figs. 6A, C); subgenital plate asymmetrical (Figs. 6C, 8B) 2
– Inferior appendages present (Figs. 5A, C, 3A, C); subgenital plate symmetrical (Fig. 2C) or absent 3
2(1). Antennae with less than 40 segments; subgenital plate asymmetrical and well

developed only on left side (Fig. 6C); tergum IX a long, narrow, ribbonlike band (Fig. 6B); segment VIII smooth dorsally (Fig. 6B) ..... *O. rareza,* n. sp.

– Antennae with more than 40 segments; subgenital plate asymmetrical and well developed on both sides (Fig. 8B); tergum IX reduced to thin band (Figs. 8A, B); segment VIII serrate dorsally (Fig. 8B) ..... *O. sierruca*, n. sp.

3(1). Inferior appendages elongate, thin and fingerlike (Kelley, 1983, figs. 4a, b) ..... *O. costaricensis* Kelley

– Inferior appendages variable, but not thin and fingerlike (Figs. 3A, 5A, 7A, 9A) 4

4(3). Segment IX short, extending anteroventrally into segment VII (Figs. 1A, 9A), often broadly rounded posteriorly in ventral view (Fig. 1C) 5

– Segment IX elongate, extending anteroventrally into segment VI (Fig. 5A) or V (Fig. 7A), usually narrowing posteriorly in ventral view (Fig. 4C) 13

5(4). Subgenital plate short in lateral view (Ross, 1948, figs. 4, 4a; Flint, 1968a, fig. 89), wide in ventral view (Fig. 1C); inferior appendages short in lateral view (Fig. 1A; Ross, 1948, figs. 4, 4a) 6

– Subgenital plate elongate in lateral view (Fig. 9A; Flint, 1991, figs. 134, 135, 138), triangular in dorsal view (Fig. 9B); inferior appendages elongate in lateral and ventral views (Figs. 9A, C) 9

6(5). Segment VIII with deep, V-shaped mesal incision ventrally (Fig. 2C); inferior appendages in ventral view elongate, rectangular and separate (Fig. 2C) ..... *O. apinolada,* n. sp.

– Segment VIII with shallow, rounded mesal incision ventrally; inferior appendages in ventral view fused, short (Flint, 1968a, fig. 91; Ross, 1948, fig. 4a) 7

7(6). Dorsolateral process of segment VIII slender, narrowing posteriorly (Ross, 1948, fig. 4) 8

– Dorsolateral process of segment VIII broad basally, upcurved and bearing stout spine at apex (Ross, 1941, fig. 28) ..... *O. glasa* (Ross)

8(7). Phallus tubular with ejaculatory duct protruding and distally recurved (Flint, 1968a, fig. 90) ..... *O. simulatrix* Flint

– Phallus divided into central tubular lobe bearing ejaculatory duct and lateral lobe encircling the shaft (Ross, 1948, figs. 4b, c) ..... *O. arizona* Ross

9(5). Segment VIII with prominent dorsolateral lobe, incised medially (Figs. 9A, B; Mosely, 1937, fig. 3b); subgenital plate elongate and triangular in dorsal view, in lateral view curving ventrad distally (Figs. 9A, B) 10

– Segment VIII without dorsolateral lobe, no incision medially; subgenital plate short and less triangular in dorsal view, in lateral view curving dorsad distally (Kelley, 1983, fig. 16) ..... *O. parazteca* Kelly

10(9). Inferior appendages in ventral view with wide, V-shaped excision at apex (Mosely, 1937, fig. 13); bilobed processes of subgenital plate prominent 11

– Inferior appendages in ventral view with shallow, rounded excision at apex (Fig. 9C); bilobed processes of subgenital plate indistinct (Fig. 9B) 12

11(10). Dorsal process of segment IX originating at midlength; bilobed process about half length of subgenital plate; phallus with apicoventral lip short (Flint, 1991, figs. 138–140) ..... *O. azteca* (Mosely)

– Dorsal process of segment IX originating anteriorly of midlength; bilobed process greater than half length of subgenital plate; phallus with apicoventral lip elongate (Flint, 1991, figs. 134–137) ..... *O. parce* (Edwards and Arnold)

12(10). Segment VIII with ventrolateral lobe small and rounded posteriorly (Flint, 1968a, fig. 81) ..... *O. janella* Denning[2]

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[2] Not seen from mainland Costa Rica during this study. Literature records of *O. janella* from the mainland need to be reexamined in light of the discovery of *O. tica.*

– Segment VIII with ventrolateral lobe elongate and narrowing to an acute tip posteriorly (Fig. 9A) ..... *O. tica*, n. sp.

13(4). Segment VIII with dorsolateral processes (Figs. 2A, 4A, 5A) 14

– Segment VIII without dorsolateral processes (Figs. 3A, 7A) 16

14(13). Processes of segment VIII arising dorsobasally (Figs. 4A, 5A) 15

– Processes of segment VIII dorsolateral in position, not basal or anterior (Fig. 2A) ..... *O. cuernuda,* n. sp.

15(14). Dorsobasal processes of segment VIII bearing numerous thick spines, widely separated basally, then converging distally (Fig. 4B); phallus bearing two simple, sclerotized lateral processes (Fig. 4D) ..... *O. espinada,* n. sp.

– Dorsobasal processes of segment VIII lacking spines, narrowly separated basally and only slightly convergent distally (Fig. 5B); phallus with sclerotized lateral processes divided at apex, with dorsal arm thin and elongate (Figs. 5D, E) .... *O. hilosa,* n. sp.

16(13). Segment IX extending anteriorly to middle of segment VI, bearing narrow, elongate dorsolateral processes (Fig. 3A); inferior appendages elongate (Fig. 3C); subgenital plate absent; phallus tubular, lacking sclerotized processes (Fig. 3D) .... *O. culebra,* n. sp.

– Segment IX extending anteriorly into segment V, lacking dorsolateral processes (Fig. 7A); inferior appendages short (Figs. 7A, C); subgenital plate prominent (Fig. 7A); phallus with pair of sclerotized distal processes (Figs. 7D, E) *O. sencilla,* n. sp.

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LITERATURE CITED

Blickle, R. L. 1979. Hydroptilidae (Trichoptera) of America North of Mexico. New Hampshire Agr. Exp. Sta. Bull. 509:1–97.

Botosaneanu, L. 1979. The caddis-flies (Trichoptera) of Cuba and of Isla de Pinos: a synthesis. Stud. Fauna Curacao and other Caribb. Isl. 59(185):33–62.

Bueno-Soria, J. and O. S. Flint, Jr. 1978. Catálogo sistemático de los tricópteros de México (Insecta: Trichoptera), con algunas registros de norte, centro y sudamerica. An. Inst. Biol. Nal. Autón. México, Ser. Zoología (1):189–218.

Denning, D. G. 1948. New species of Trichoptera. Ann. Entomol. Soc. Am. 41:397–401.

Eaton, A. E. 1873. On the Hydroptilidae, a family of Trichoptera. Trans. Entomol. Soc. London. 1873:125–150.

Edwards, S. W. and C. R. Arnold. 1961. The caddis flies of the San Marcos River. Tex. J. Sci. 13:398–415.

Flint, O. S., Jr. 1964. The caddisflies (Trichoptera) of Puerto Rico. Tech. Pap. Univ. Puerto Rico Agric. Exp. Sta. 40:1–80.

Flint, O. S., Jr. 1968a. The caddisflies of Jamaica (Trichoptera). Bull. Inst. Jamaica Sci. Ser. 19:1–68.

Flint, O. S., Jr. 1968b. Bredin-Archbold-Smithsonian Biological Survey of Dominica 9. The Trichoptera (caddisflies) of the Lesser Antilles. Proc. U.S. Nat. Mus. 125(3665):1–86.

Flint, O. S., Jr. 1974. The Trichoptera of Surinam. Studies on the Fauna of Suriname and other Guyanas 14:1–151.

Flint, O.S., Jr. 1980. Studies on Neotropical caddisflies XXVI: new species from Argentina (Trichoptera). Rev. Soc. Entomol. Argentina 39:137–142.

Flint, O. S., Jr. 1991. Studies of Neotropical caddisflies, XLV: the taxonomy, phenology, and faunistics of the Trichoptera of Antioquia, Colombia. Smithsonian Contrib. Zool. 520: 1–113.

Harris, S. C. and R. W. Holzenthal. 1990. Hydroptilidae (Trichoptera) of Costa Rica: the genus *Mayatrichia* Mosley. J. New York Entomol. Soc. 98:453–460.

Holzenthal, R. W. 1988. Catálogo sistemático do los tricópteros de Costa Rica. (Insecta: Trichoptera). Brenesia 29:51–82.

Kelley, R. W. 1983. New Neotropical species of *Oxyethira* (Trichoptera: Hydroptilidae). Proc. Entomol. Soc. Washington 85:41–54.

Kelley, R. W. 1984. Phylogeny, morphology and classification of the micro-caddisfly genus *Oxyethira* Eaton (Trichoptera: Hydroptilidae). Trans. Am. Entomol. Soc. 110:435–463.

Marshall, J. E. 1979. A review of the genera of the Hydroptilidae (Trichoptera). Bull. Brit. Mus. Nat. Hist. (Entomol.) 39:135–239.

Mosely, M. E. 1937. Mexican Hydroptilidae (Trichoptera). Trans. Roy. Entomol. Soc. London 86:151–190.

Mosely, M. E. 1939. The Brazilian Hydroptilidae (Trichoptera). Novit. Zool. 41:217–239.

Neboiss, A. 1963. The Trichoptera types of species described by J. Curtis. Beitr. Entomol. 13:582–635.

Ross, H. H. 1941. Descriptions and records of North American Trichoptera. Trans. Am. Entomol. Soc. 67:35–126.

Ross, H. H. 1948. Notes and descriptions of Nearctic Hydroptilidae (Trichoptera). J. Washington Acad. Sci. 38:201–206.

Wiggins, G. B. 1977. Larvae of the North American Caddisfly Genera (Trichoptera). Univ. Toronto Press, Toronto. 401 pp.

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